AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

OCTOBER, 1919 VOL. 25 No. 310

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NOTICE TO OUR READERS

As this magazine goes to press announcement is made of a severe fire in the offices of the American Forestry Association in which many of the valuable records, papers and all back issues of the magazine, etc., have been totally destroyed. It will be necessary to ask that any letters of inquiry or other correspondence addressed to the Association within the last ten days be repeated. Delays in the conduct of the current business of the Association and the issuance of the magazine, AMERICAN FORESTRY, must necessarily follow, and indulgence and leniency is asked of our members.

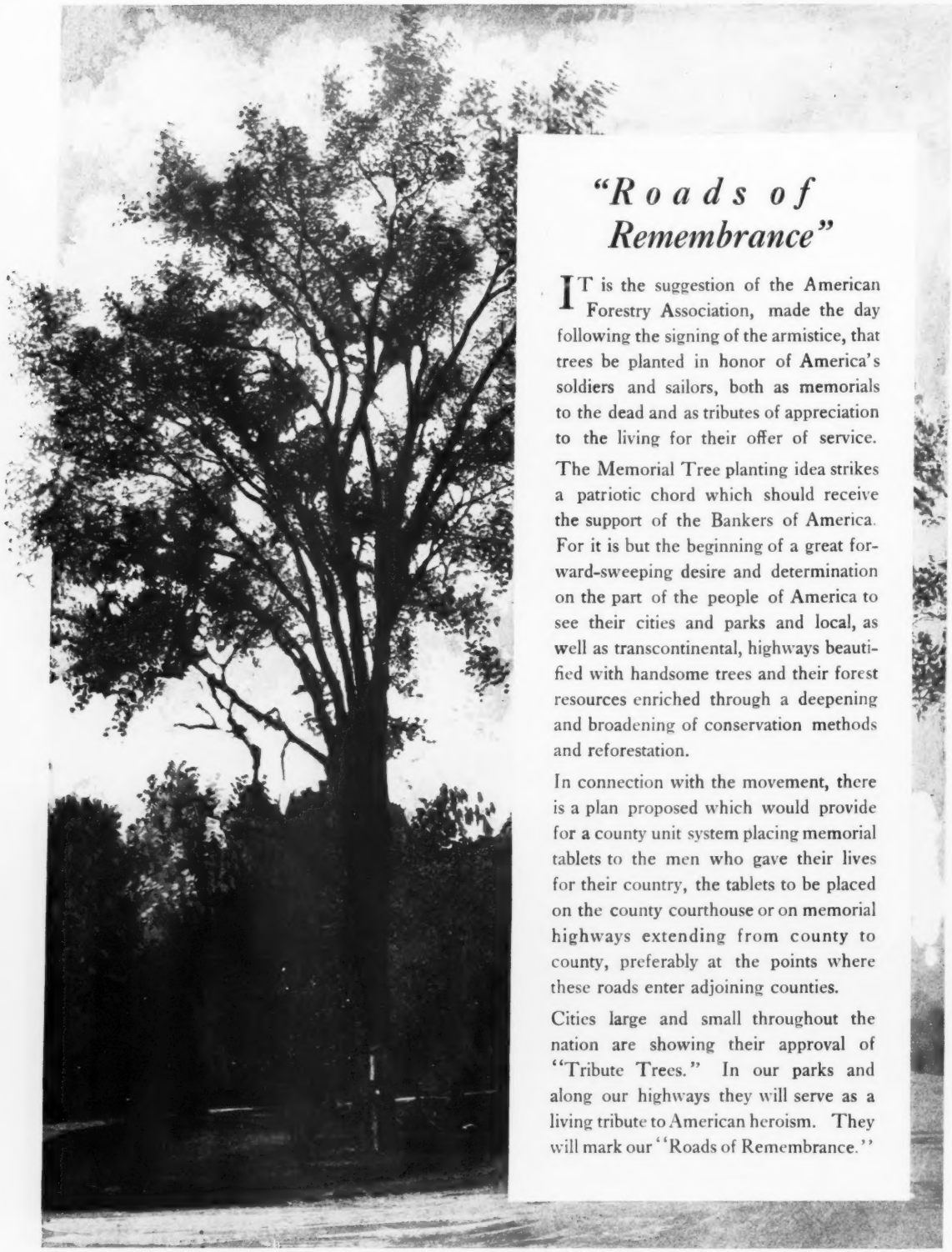
P. S. RIDSDALE.

Entered as second-class matter December 24, 1909, at the Postoffice at Washington, under the act of March 3, 1879. Copyright, 1919, by the American Forestry Association. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized July 11, 1918.

LLAO ROCK

The famous sentinel in Crater Lake, National Park.

TO THE BANKERS OF AMERICA



"Roads of Remembrance"

IT is the suggestion of the American Forestry Association, made the day following the signing of the armistice, that trees be planted in honor of America's soldiers and sailors, both as memorials to the dead and as tributes of appreciation to the living for their offer of service.

The Memorial Tree planting idea strikes a patriotic chord which should receive the support of the Bankers of America. For it is but the beginning of a great forward-sweeping desire and determination on the part of the people of America to see their cities and parks and local, as well as transcontinental, highways beautified with handsome trees and their forest resources enriched through a deepening and broadening of conservation methods and reforestation.

In connection with the movement, there is a plan proposed which would provide for a county unit system placing memorial tablets to the men who gave their lives for their country, the tablets to be placed on the county courthouse or on memorial highways extending from county to county, preferably at the points where these roads enter adjoining counties.

Cities large and small throughout the nation are showing their approval of "Tribute Trees." In our parks and along our highways they will serve as a living tribute to American heroism. They will mark our "Roads of Remembrance."

THIS TITLE PAGE FROM THE BURROUGHS CLEARING HOUSE, A PUBLICATION FOR BANKERS, IS AN EXAMPLE OF THE FINE CO-OPERATION THAT IS BEING GIVEN THE CAMPAIGN OF THE AMERICAN FORESTRY ASSOCIATION FOR MEMORIAL TREE PLANTING AND ROADS OF REMEMBRANCE. HERE IS A PUBLICATION DEVOTED TO BEST BUSINESS METHODS YET ITS EDITOR IS QUICK TO SEE THE OPPORTUNITY IN MEMORIAL TREE PLANTING FOR BETTER ROADS WHICH MEAN BETTER BUSINESS AND A BETTER COUNTRY.

AMERICAN FORESTRY

VOL. XXV OCTOBER, 1919 NO. 310

THE FOREST POLICY OF FRANCE--ITS VINDICATION

BY W. B. GREELEY, LIEUT.-COL. ENGINEERS

"FRANCE will perish for want of wood," exclaimed Colbert in 1669. The fears of this far-sighted Minister of old France, which led to a revision of forestry laws that has profoundly influenced all subsequent legislation, might indeed have been realized in this great war. Wood was one of the most vital military necessities; and France had to supply from her own forests not alone the needs of her own vast armies for four and a half years but also the larger part by far of the timber used by the British, Belgian, and American forces. The American operations alone required 450,000,000 feet of timber and 650,000 cords of fuelwood, and less than one per cent of this enormous quantity was brought from the United States. For the abundant supplies of timber directly available to the battle lines, the Allied world must thank the patience and foresight with which the French nation has built up its forest resources. Apart from its value to her peace-time life and industries, the forest policy of France has been vindicated as a capital element of national strength in the greatest crisis of her history.

The development of this policy has not been smooth and uninterrupted. It has suffered setbacks. It has reflected the social and political upheavals of the last two centuries. It has been influenced by changes in economic conditions and emphasis. Certain chapters in its history bear a striking resemblance to the disposal of public timberlands in the United States. As a whole, it is a fruitful field of study for the American forester and economist. Particularly at the present time, when the war has brought home to us the weakness and danger of our own indifference toward the forest resources of the United States, is it opportune to take note how similar problems have been worked out in France. I hope, in subsequent articles, to describe a few of the more important features of French forest policy, the "regime forestier"—its backbone, private forestry in France, and the fight against sand dunes and mountain torrents. I shall

A TRAINLOAD OF LARGE HARDWOOD LOGS CUT FROM ONE OF THE ROTHSCHILD ESTATES BY THE 20th ENGINEERS

try now to give a picture of French forestry in the broad, —its historical setting, the national conceptions which it expresses, and what it has accomplished.*

The forestry ordinances of the "ancien regime" contained a mass of detailed restrictions, designed not only to prevent a diminution in the forested areas but also to control the methods of cutting and using timber. Hardwood sprout forests could not be cut before the age of ten years; and then a certain number had to be reserved to produce large timber. The age when large trees might be cut and methods of securing regrowth were carefully defined. The needs of the royal navy were protected by requiring special sanction from the king before large timber could be cut within 10 leagues of the sea or 2 leagues of a navigable river—a regulation which calls to mind that the first forestry legislation of the United States was the reservation of oak and cypress lands for the supply of the American navy.

This forestry code was in keeping with the whole rural legislation of the times. The freedom of land owners was restricted at almost every turn by royal decrees. Vineyards could not be planted in certain cantons. The fallowing of land at stated periods was obligatory in nearly all forms of culture. It is significant that the public interest was but a secondary and incidental object of these onerous restrictions. The king regarded himself as the guardian of his people; and sought to protect his subjects against injuries to their own interests.

The great outburst of democracy and individualism in the French Revolution unceremoniously threw this maze of restrictive legislation out of doors. The free citizen of the new era was released from all guardianships. A law of 1791 declared that the forests of private owners ceased to be under control of the State. Their owners were free to cut or destroy as they saw fit. During the succeeding half century a large number of private forests were wiped out. Even after public control of the denudation of private woodlands was restored, its application was extremely lenient for many years. Authorizations to destroy 489,000 hectares (1,222,500 acres) were granted subsequent to 1828, no records prior to that date being available. The demand for cereals, particularly in northern France, had much to do with the large aggregate decrease in the forested area of the country, for many of the French forests in the plains occupied land similar in character to that under cultivation. In southern France and in her mountains, the predominance of pastoral industries led to a gradual diminution in the area of woodland from excessive grazing.

Modern French writers are agreed that this suddenly gained liberty of the Revolution was abused; that the transition from the restrictive guardianship of the sovereign to the new regime of "laissez faire" was too rapid and the land owners too inadequately prepared to use their freedom. But the movement as a whole was an inevitable and necessary part of the change from the old

*Much of the material for these articles has been taken from Guyot's Cours de Droit Forestier.

AN AMERICAN SAWMILL AMONG SAND DUNES WHICH WERE BARREN WASTES 75 YEARS AGO

ANOTHER OF THE SAWMILLS OF THE 20th ENGINEERS IN THE VOSGES MOUNTAINS

political and economic order to the new. It extended indeed to the state forests, sequestered properties of the crown and nobility. Particularly during the period from 1814 to the end of the second Empire, a large number of state forests were alienated under the theory that it was wise to convert this public property into cash and that the land would best contribute to the economic welfare of the country under private ownership and use. These alienations carried no restrictions as to cutting or denudation and in the case of most of them reforestation was left to chance.

The most interesting feature of this history is not the extent of the reaction but the rapidity and effectiveness with which French common sense and French conservative instinct toward natural resources reasserted themselves under the very freedom of democratic institutions. As early as 1803, a law restored public control of the extent to which privately owned forests might be destroyed. And in 1827 was adopted the "code forestier" which, with minor modifications, has remained to the present day as the corner stone of French forest policy. The forestry code aimed primarily to establish the basis for administering and perpetuating the forests in all forms of public ownership. But the conceptions underlying it are of special interest as illustrating the attitude of the French toward their forest resources as a whole—private as well as public; an attitude which finds expression in practically all the subsequent legislation.

The French conceive of their forests as standing apart from other forms of real property because of (1) their peculiar nature from the standpoint of principal and interest and (2) their public utility. The trees composing a forest at any given time represent its capital, or growing stock, together with certain quantities of wood which have been produced by that capital and comprise its expendable revenue, which will be realized from time to time by cutting. Revenue and capital are thus intermingled; both are readily convertible into money; and the danger of reducing the forest capital of the country by unwise or ill-timed lumbering is always present. Furthermore, a forest once ruined by abuse restores itself slowly. While a few years can efface the effects of poor farming, a century may be required to restore a forest capital reduced or destroyed by imprudent cutting. On the other hand, their public utility demands that the forests of the country be extended rather than reduced. Forests figure largely in the public policies of France because the French know that, aside from their direct economic value, forests hold the soil on mountain slopes, prevent erosion, stop the devastation of shifting sand, preserve the sources of their rivers and their marvelous inland waterways, and maintain the atmospheric humidity necessary for the cultivation of the valleys. Hence the necessity of special and restrictive legislation, going far beyond the terms of the common law, even beyond the provisions of the penal code, to preserve the integrity of French forests, public and private alike.

This conception is well expressed in Guyot's discussion of the laws against the destruction of privately owned forests.* "This legislation constitutes a remarkable anomaly in our civil law concerning the legal obligations imposed on private property. In principle, the private owner is free to use and enjoy his property, free

*Cours de Droit Forestier, Livre V., Par. 1659

also to dispose of it and to change it as he pleases. The prohibition of denudation applies to but one class of landed property, the forest. An agricultural proprietor can transform his property, make a meadow of a cultivated field, a pasture of a vineyard; but such changes are forbidden to the forest owner. He must preserve his property in a forested condition even when he might profit by a change. This lucrative operation is forbidden him in the public interest. He might, indeed, be indemnified for the heavy burden which is imposed upon him. But he can seek no compensation, no remittance of taxes, no special favor.

"How shall we justify an intervention of the state so exceptional, a limitation so extraordinary upon the rights of every private owner? It can be explained only by the special nature of forested property. It is this character peculiar to itself which has prompted the enforcement of a forestry regime upon public owners like the communes. The forest once destroyed is so slow to reestablish itself that future generations must be guaranteed against abuses by the present generation. If the country needs wheat, nothing is easier than to increase the culture of cereals from one year to another; but if the need be for wood, the creation of new forests will require long years during which the public interests will suffer gravely."

MULE TEAM BRINGING MARITIME PINE LOGS TO A MILL IN SOUTHWESTERN FRANCE

The most striking examples of this solicitude for the preservation of their forests are found in the French code for the administration of publicly owned forests and the laws restricting the denudation of woodlands in private ownership. In each appear significant exceptions to the general principles which the individualistic and liberty-loving French have incorporated in their legislation since the revolutionary period. The "code forestier" not only defines in precise terms the methods of administering forests owned by the state, the communes, and by public institutions, based upon continuous production and the cutting of no more than the current growth. It contains its own, distinctive, and complete penal system for the protection of these properties. Its penal code is almost taken bodily from that existing under the "ancien regime" and differs profoundly from the modern penal laws of France. Its basis is the fine, imposed in accordance with fixed and arbitrary schedules, which are obligatory upon the courts and leave the judge no discretion to consider mitigating circumstances. These penalties are set forth in minute detail, even to the imposition of heavier fines in cases where trees are cut at night or with a saw because such trespasses are more difficult to detect. The forest officers themselves exercise many judicial functions in the punishment of trespasses. They may even enter that stronghold of French individual liberty, the home, without warrant, in search of evidence that offenses have been committed.

The laws concerning private forests impose no prescribed methods of cutting other than the obligation resting upon every owner not to destroy his forest without prior warrant from the state. Such warrants may be issued by the Minister of Agriculture upon a favorable report from the Conservateur of Waters and Forests, but may be refused on the ground that the proposed denudation would be injurious to the protection of mountain soils from erosion, to the protection of inland areas from shifting sand, to the sources of streams, or to the public health. It is to be noted that the right to destroy a forest can not be withheld on the grounds of the needs of the country for timber, although many attempts have been made to incorporate such a provision in the law. The teeth of the legislation concerning the denudation of

private forests are found in the severe fines which are imposd if the destruction of a forest actually takes place, without warrant, and in the discretion of the Minister to order the reforestation of the land by planting. If this is not done by the owner within three years, it may be done by the state at the owner's cost. It makes no difference whether the denudation was intentional or not. The penalties are applicable if a forest actually disappears as the result of severe cutting or grazing.

These restrictive measures constitute but one phase of the forest policy of France. Its constructive features are equally striking. Foremost among them in commanding the admiration of the forest engineers in the American Army stands the conquest of the sand dunes on the southwestern coast and the conversion of the old bed of the Atlantic Ocean, formerly a thinly populated stretch of sand and marsh, into one of the most productive regions of France. Adjoining the South Atlantic Coast, is a belt of sand dunes covering some 350,000 acres. During the 18th century, the inland movement of these dunes, which traveled from 30 to 80 feet a year, buried entire villages and farms and threatened to destroy the economic life of the entire littoral. Experiments were begun by French engineers as early as 1784 in stabilizing the dunes by sowing the seed of maritime pine under a cover of brush or herbaceous plants. Their success led to the adoption in 1810 of a systematic plan for controlling the dunes by the French government. State forests were established in part of the territory; but much of the planting was done on communal and private lands, under the principle of the state's paying the costs and then retaining the use of the land for a sufficient period to recoup itself from the forests established.

The stabilization of the dune belt was actually accomplished in about sixty years, but the impetus given to the planting of maritime pine by private owners and communes has extended the forests of this valuable tree over almost the entire area of sand plains in southwestern France. The departments of the Landes and Gironde contain today 1,500,000 acres of private forests, by far the greater part of which were established by planting. The forests of this region, created almost wholly by human foresight and patience, contained nearly a fourth of the timber of France at the outbreak of the war and were one of the most important sources of supply for the French, British and American Armies. The 20th Engineers cut ties and sawlogs from state forests in the dunes themselves which, sixty years previously, were not only wholly unproductive but a menace to the country. And aside from the production of timber, the afforestation of

Underwood and Underwood—*British Official Photograph*

GERMAN TRENCHES SMASHED UP BY BRITISH GUN FIRE IN THE BATTLE OF FLANDERS. THIS GIVES AN IDEA OF THE AMOUNT OF TIMBER USED IN FIELD FORTIFICATIONS

the Landes has created the naval stores industry of southern France, drained its malarial marshes, enormously increased its population, and built up the productivity of its agricultural lands through the extensive cropping of forest undergrowth and litter for the fertilization of farms.

A similar struggle, not yet ended, has been waged with

BRUSH FROM FRENCH FORESTS USED IN REVETTING TRENCHES

the mountain torrents which have seriously eroded portions of the French Alps, with resulting floods and the destruction of agricultural lands in the valleys below. One of the worst effects of the sudden removal of restrictions upon the use of private lands, brought about by the Revolution, was the destruction of many forests in the high mountains and the excessive grazing of mountain pastures. Effective legislation to combat these perils was long held back by the difficulty of harmonizing the vigorous public action needed with French conceptions of individual liberty and initiative and by the conflict of interests between the pastoral folk of the mountains and the farmers of the plains. The terrible floods of 1859 prompted the enactment of a law for the reforestation of the mountains (July 28, 1860). It provided for the establishment of restoration areas within which reforestation and other measures would be undertaken by the state and by communes and private agencies with state aid. All forests within restoration areas, of whatever ownership, were placed under the administration of the Waters and Forests Service in conformity with the conservative requirements of the "regime forestier." Additional laws passed in 1864 and 1882 provided for the restoration of grass cover on denuded mountain lands under certain conditions and for various preventive measures in the mountain zone generally, particularly the regulation of grazing.

Some phases of this attempt to check torrential erosion in the mountains have not been successful, and the problem is a very live one in France today. The most effective steps yet taken have been the reforestation of lands owned by the state or communes and the purchase of mountain forests by the central government. This is directly analogous to federal purchases of forests on the headwaters of navigable streams in the United States under the Weeks Law. While the French government has ample authority to add to its state forests, by purchase, in any part of the country, such acquisitions have, up to the present, been limited to mountain regions in connection with restoration projects. Many French foresters and economists advocate the extension of the public holdings in other sections, particularly in the oak forests of the plains where the timber of large size and high quality needed by industries like shipbuilding may not be grown by private owners.

Coupled with the laws restricting the freedom of the private owner in France to destroy his forest, is a series of constructive measures designed to promote the production of timber on private lands. Tax exemptions, in varying degrees, are extended to forest plantations during their first thirty years. The exemption is complete in the case of seeded or planted land on the slopes

BINDING FAGOTS OF BRUSH FOR USE AT THE FRONT

or summits of mountains, on sand dunes, and on land previously barren. If the planted land was under cultivation during the preceding decade, three fourths of the taxes are remitted. If the land has been fallow for ten years or more, it remains taxable but the assessed value of the bare land can not be increased for thirty years.

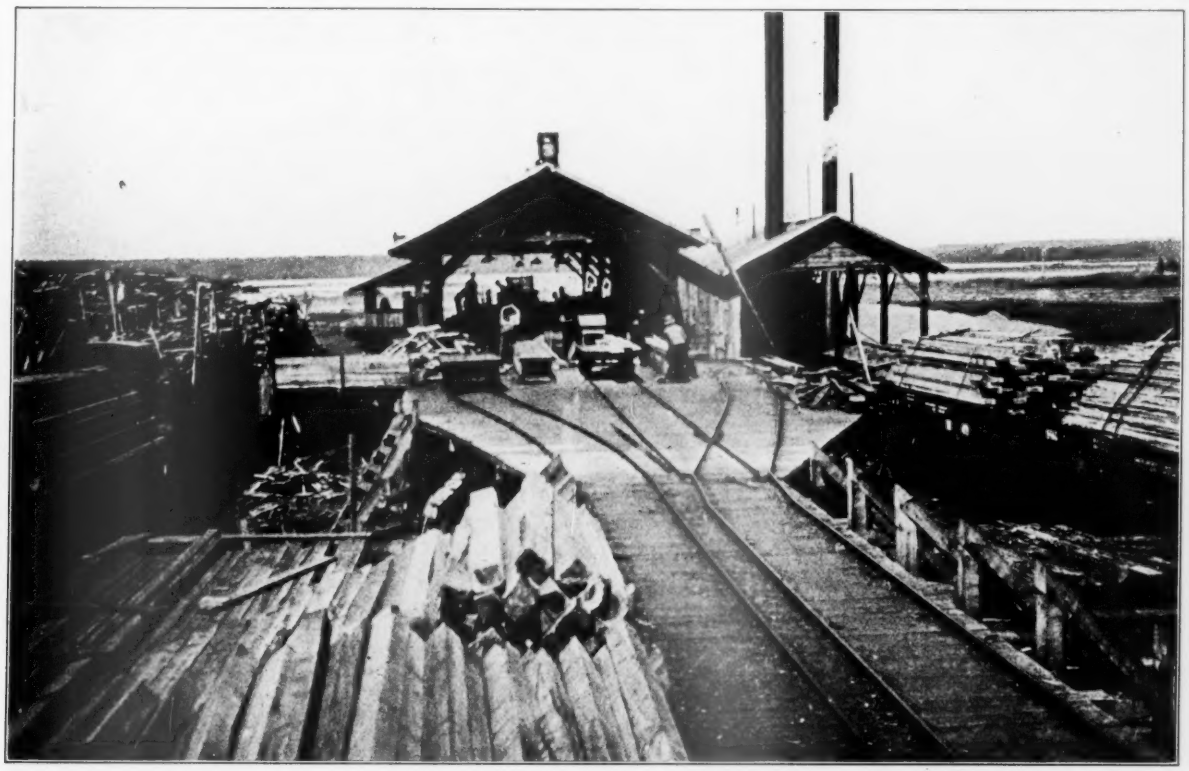
Other laws encourage the formation of local associations of forest owners for the joint administration of their properties. (The "syndicate" so common all over France for collective action in various enterprises). Such associations may extend from cooperative protection against fire or trespass to the complete management of timbered areas. And by a statute enacted in 1913 the services of the state foresters are offered to private owners or associations, at cost, in the protection or administration of their properties. Such measures, aiming to reduce the cost of technical management of timberlands, are especially adapted to the conditions in France, where timber values are high and forestry practice is general and well understood.

Private timberlands, in fact, comprise over two-thirds of the forest resources of France. 18.7 per cent of her

area is forested, or about 23,455,000 acres. The three million acres of state forests represent but 12 per cent of this total while another 20 per cent, owned by communes and other public agencies, is also under state administration. The rest is in private hands. The belief is common that the area of forests has been reduced below the minimum essential to sustained national prosperity and there is a strong demand in many quarters for extending the state forests, particularly in the mountain regions in connection with the checking of erosion and protection of water sources. But the results obtained by painstaking care in handling the limited resources of France are truly remarkable. Imagine a third of the population of the United States crowded into an area less than that of Texas and still supplying 70 per cent of their timber and all of their fuelwood from the current production of their forest lands.

Prior to the war, there were cut yearly from the forests of France 2,250,000,000 feet of timber and 4,670,000 cords of fuelwood. In addition to these amounts, some 400,000,000 feet of timber and 167,000 cords of fuel were obtained yearly from trees planted along roads and canals, from farm hedges, and from the plantations of poplar which are a common feature of farms throughout central and northern France. It is probable that France contained, in 1914, at least 150 billion feet of merchantable timber. The adequacy of her forest resources, however, was judged—not by the quantity of stumpage but by the current yield of forest land. The yearly cut at the outbreak of the war amounted to 100 board feet of lumber and half a cord of fuelwood from every acre of forest land in France.

This does not, however, tell the whole story of what France has accomplished in forest conservation. Due to the conservative temper of their race, forest owners, public and private alike, have not cut as much as they might; they have not used the full current revenue from their timber capital. They had accumulated a surplus by the outbreak of the war probably equal to four and a half billion feet, or twice the usual yearly cut. This surplus, together with the uniformly well-stocked and productive condition of their forest lands, was a prime element of national strength in the great struggle. The longer the 20th Engineers operated in France, the more timber their scouts located. Our early conceptions of timber shortage in France were constantly revised upward. The enormous demands of the allied armies could have been met for one or two years longer without cutting seriously into the growing stock of the country.



A MILL OF THE AMERICAN EXPEDITIONARY FORCE IN THE DUNES OF SOUTHWESTERN FRANCE

The progress of France in forestry, like that of any other country, is of course an intimate phase of her own historical and economic evolution, the result of her peculiar physical conditions and the racial characteristics of her people. Its special interest to Americans lies in the fact that it is not a policy created by imperial edict—but the freely adopted regime of an intensively democratic and individualistic people. It would be futile to

(*Continued on Page* 1424)

WHEN TREES GROW

BY PROF. J. S. ILLICK

CHIEF, BUREAU OF SILVICULTURE, PENNSYLVANIA DEPARTMENT OF FORESTRY

NOTHING about the numerous processes of trees is more readily comprehended than that they grow, for the results of growth are so obvious, and in some cases striking, particularly in temperate regions where annually a period of vegetative rest alternates with a period of vegetative activity.

The belief is prevalent that trees grow throughout the general growing or vegetative seasons, which embraces the middle states from 150 to 200 days, and extends from the last killing frost in the spring, that is, when the leaves of the larches, birches, cherries, and maples appear, to the first killing frost in the autumn when the leaves exhibit their autumnal coloration. This, however, is a mere supposition, for most of the native and introduced forest trees in the vicinity of Mont Alto, Pennsylvania, make *ninety per cent of their height growth in less than forty days.*

The following tabulation, based on data obtained in Pennsylvania, lists five representative species of forest trees, gives the date in spring when the growth of each starts, indicates the percentage of the total growth of the season opposite specified dates, and schedules the progress, duration, and cessation of growth.

Not all forest trees begin to grow at the same time. Some start early in spring while others begin rather late. The Wild Black Cherry, *Prunus serotina* is the first forest tree in the vicinity of Mont Alto to begin height growth. The elongation of its twigs starts about the fourth of April. The Domestic Cherry, *Prunus avium,* begins its growth about four days later than the native Wild Black Cherry. The Sweet Buckeye, *Aesculus octandra,* begins about April 6, White Pine, *Pinus Strobus,* about April 18, Tulip Tree, *Liriodendron Tulipfera,* about April 25, and Norway Spruce, *Picea Abies,* about May 6. The date when the different species start the elongation of their twigs depends upon the inherent tendency of the species and the factors of the environment. The late opening of the buds of Norway Spruce is not a local characteristic, but an inherent tendency, for records from Germany show that they usually

DO YOU KNOW THAT

Trees make nine-tenths of their height growth in less than forty days?

Most trees start growing in April and stop growing in May or June?

Trees grow twice as much at night as during the day?

Some trees grow steadily during the growing time and others rest for days and then continue their growth?

That two rings may sometimes represent only one year's growth?

EUROPEAN LARCH IN FULL FOLIAGE

A coniferous tree which sheds all its foliage each autumn. Lower buds begin to swell early, leaves emerge rapidly, but elongation of shoot does not begin until about the middle of May.

TERMINAL SPRAY OF PITCH PINE

Showing the original and the second growth of the season. Fictitious rings are regularly formed when a prolonged resting period occurs within the growing season.

LATE SPRING AWAKENING OF NORWAY SPRUCE

During early May the buds usually begin to swell. Elongation of the twigs begins at the base of the trees and proceeds upwards.

open after May 8, and in the extreme northern part after the end of May. On the other hand, factors of the environment, such as latitude, altitude, exposure, shade and shelter, also have a strong influence on the starting time of the season's growth. As a rule, buds open about two and one-half to three days later with each degree

	Wild Black Cherry	Sweet Buckeye	White Pine	Tulip Tree	Norway Spruce
Growth Starts	April 4th	April 6th	April 18th	April 25th	May 6th
April 15	7.5%	67.5%	00.0%	00.0%	00.0%
May 1	15.0	95.0	12.1	1.2	00.0
May 15	25.0	100.0	46.2	23.4	22.4
June 1	42.5		92.1	58.8	74.1
June 15	62.5		98.8	88.8	99.2
July 1	87.5		100.0	97.4	100.0
July 15	97.5			98.9	
August 1	100.0			100.0	

45.0% 80% 65.4% 76.8%

of latitude and about two to two and one-half days later with each 350 feet of altitude. White oak begins its growth from seven to fourteen days later on northern than on southern exposures on the Mont Alto State Forest. Trees with small and partially or completely imbedded buds such as Honey Locust, Black Locust, Kentucky Coffee-Tree, Tree of Heaven, and Catalpa, begin growth relatively late. Nature seems to protect the tender growing points of these trees from the cold of winter by placing them within small buds which are almost completely imbedded within the twigs. This means of adaptation also protects the tender new growth of spring from late frosts, for the small and deeply imbedded buds are not stimulated so early in spring as large exposed buds; hence, the resultant vegetative growth usually appears after the damaging frost period.

Pennsylvania is the meeting ground of many northern and southern forest tree species. The northern follow the mountains towards the south and the southern extend northward through the valleys. The distinctly southern species, which are decidedly sensitive to spring frosts, as a rule, begin the elongation of their shoots rather late, that is, after the danger period of frost damage is past. The Eastern Catalpa, supposedly a native of the South Atlantic States, does not leaf out until the latter part of May. Likewise other southern species, such as Persimmon, Kentucky Coffee-Tree, and Bald Cypress postpone the beginning of their vegetative elongation until late spring.

The range of the period during which the height growth of forest trees ceases is longer than that during which height growth starts in the spring. The Sweet Buckeye, *Aesculus octandra,* usually completes its growth at Mont Alto as early as May 10 to May 15, and by June 15 one can find full-sized winter buds. This species is the first to complete its height growth of the season. Most species of forest trees in southern Pennsylvania cease growing during the latter part of May and the early part of June. Only a few species continue their growth into July. On June 10, 1919, I examined 79 different species of trees in the vicinity of Mont Alto, 55 of which, that is 70 per cent, had already ceased growing in height. On June 18 and 19, 1919, I examined 50 species of trees in the vicinity of Bedford, Pennsylvania, and found that the height growth of 40 had already stopped. This is an unusually high percentage of growth cessation, and is probably due to the extremely cold period during the early part of May, followed immediately by an unusually hot period during late May and early June. Such extreme temperatures and the abrupt transition from one extreme to the other are potent factors in retarding growth and in extreme cases may cause entire cessation of growth. The White Pine, which usually stops growing in the vicinity of Mont Alto about June 15, but may continue to grow as late as June 30, ceased growing this year (1919) about June 3. It is the writer's belief that 85 per cent of the forest trees of Pennsylvania have already (June 20, 1919) completed their normal height growth for the season. Of the remaining 15 per cent of the Tulip Tree, Sycamore, and the Larches are prominent species, which may continue to grow until the middle or latter part of July. By the

THE WHITE OAK MAY TAKE A REST

The large fully developed leaves are the result of the original growth of the season. After resting for 20 days, growth was resumed, and the terminal shoot bearing immature leaves is the result.

first of August the normal height growth of *all* the forest trees of Pennsylvania has, as a rule, ceased.

In order to determine the progress of the height growth each species must be examined by itself, for each individual species possess distinctive inherent growth characteristics. Some place their growth without a break, while

others place it by leaps and bounds alternating with rest periods. In this respect the method of working followed by trees, and growth surely is work, differs little from the methods of other organisms, including man. Rarely does any organism work continuously, but rest periods are usually, and sometimes frequently, interspersed between the periods of work. Rest periods, however, should not be regarded as synonymous with idleness, for

JUST BEFORE HEIGHT GROWTH STOPS

The twigs of Norway Spruce take a decidedly drooping position for a few days just prior to the cessation of height growth.

they are normal prerequisites to the optimum functioning of all organisms. Without them no organism can attain optimum efficiency nor maintain health.

Few comprehensive statements can be made regarding the growth behavior of forest trees during the growing season. There is wide divergence between the height growth behavior of Wild Black Cherry, Sweet Buckeye, White Pine, Tulip Tree, and Norway Spruce. Yet, in spite of this wide divergence the fundamental features of the growth procedure throughout the growing season may be summarized as follows: *Growth begins slowly, after a variable period rises rapidly, then reaches a maximum which is maintained for a short while, finally falls gradually to a minimum, and then ceases completely.*

The actual growth is, however, less regular than charts indicate, for the rate of growth usually exhibits a certain rhythm or periodicity. It progresses by leaps and bounds alternating with rest periods, which may be of long or short duration. Rest periods of short duration occur frequently and at irregular intervals, but are hard to detect with instruments of ordinary precision. Rest periods of longer duration are also common and readily measurable.

The height growth of a Chestnut Oak, *Quercus Prinus,* tree during the 1918 growing season showed the terminal shoot started to grow on April 17 and continued its elongation until May 23, when the first upward thrust ceased. A resting period of 24 days followed and on June 16 growth was again resumed and continued until July 13, a period of 27 days. The first growing period extended over 34 days during which the terminal shoot elongated a total of 10 inches, that is an average of approximately one-third of an inch per day. This was followed by a cessation of growth for 24 days when the second and final elongation of the season began. The second growing period extended over only 27 days during which the terminal shoot elongated a total of 13.5 inches, that is an average of one-half an inch per day. Such a periodicity of growth is not unusual, but rather peculiar to

TAKING A DAILY MEASUREMENT OF GROWTH

The terminal twig of Norway Spruce is the last to begin its elongation, but by the end of the growing season it exceeded all others in length. Some trees grow in height more than one-inch each day during the grand period of growth.

certain species. Pin Oak, Black Oak, Chestnut Oak, and Pitch Pine frequently begin to place a second growth 10 to 25 days after the original growth of the season has ceased.

The period during spring and summer when height growth does not progress may be regarded as a *resting period,* a *recuperative period,* or a *period of preparation.*

The trees apparently rest but in reality they are preparing for the next upward thrust which may be longer than the original advance. Furthermore, the writer believes that the recurring rest periods may become a rather fixed and regular feature of the growth of certain species. This is certainly true in the case of normal young Pitch Pine in the vicinity of Mont Alto which exhibits annually

AFTER HEIGHT GROWTH HAS CEASED

Immediately following the completion of height growth the twigs of Norway Spruce assume an erect position, begin to stiffen, and develop winter buds.

a cessation of growth for a period of two to three weeks.

The rate of tree growth not only fluctuates throughout the growing season but also during each day. The maximum growth usually occurs late at night, apparently after the preparation and translocation of food and other essential materials becomes less active, and the minimum growth falls in the afternoon of each clear day when the greatest activity in the manufacture of starch and sugar is in operation.

About 20 trees of each of the four species given in the following tabulation were measured regularly at 7.30 P. M. and 7.30 A. M. for a specified period. The derived results for height growth during the day and at night are given in the following tabulation:

SPECIES	DAY	NIGHT
Tree of Heaven	35%	65%
Tulip Tree	40%	60%
Norway Spruce	18%	82%
White Pine	39%	61%
Average	33%	67%

This tabulation shows that trees grow about twice as much at night as during the day. By using instruments of greater precision the percentages would no doubt be changed somewhat, but the general comparative rate of growth would still stand unchanged.

To some persons it may appear that the problem of growth behavior of trees has only an academic application. This point of view is, however, untenable for there is an economic side to the study. If conducted in a scientific manner it will supply the basic data for the preparation of a rational schedule for transplanting in the nursery and setting out trees in the woodlot and forest. Foresters, silviculturists, and plant physiologists recommend that planting and transplanting operations should be conducted when the material to be planted is in a dormant condition. No fault can be found with their recommendation, but in order to execute it properly one must know when trees really are dormant. This can

A "DOUBLE-HEADER" OF HEIGHT GROWTH OF CHESTNUT OAK

Height growth often proceeds by leaps separated by rest periods of variable duration. The original growth of the season bears mature leaves, while the second period of growth is characterized by a sparse setting of immature leaves.

be ascertained best by determining when trees grow, since growth is so evident and measurable, and whenever trees are not growing they are dormant, that is, in a static condition, the duration of which is hard to determine.

Furthermore, such a study facilitates the preparation of a schedule for field work covering the problem of growth. That determination of the quantitative and

qualitative growth on cut-over lands is one of the most important and urgent problems in American forestry is conceded by the most authoritative foresters. This is one of the four major problems which the chairman of the forestry committee in the Division of Biology and Agriculture of the National Research Council recommends as worthy of immediate and thorough consideration. Heretofore, we have generally been instructed that the height growth of the season cannot be accurately ascertained until late in fall or during the winter months when the weather is relatively unfavorable for field work and the days rather short. Consequently, it now follows that since trees actually cease growing in height in May or June, no reasonable exceptions can henceforth be filed against the collection of height growth data immediately after the cessation of growth in summer.

It should be understood, however, that the problem WHEN TREES GROW is but a prelude to the major problem, which is far more comprehensive, and includes also a study of diameter and volume growth of the stem and the growth of roots, all of which should be undertaken; for the results derived therefrom would be of great economic value.

A knowledge of WHEN TREES GROW also aids in the determination of the best time to peel bark. Bark can be peeled satisfactorily only when the sap is abundant and active. Briefly, the bark peeling season coincides with the growing season of trees, even to the extent that lumbermen recognize a "second sap" period during June in Chestnut Oak trees. This furnishes practical proof that the second period of growth recurrs rather regularly in this species. The second period is usually short and the bark does not peel so satisfactorily as in the first period of the season. It is, therefore, recommendable that the period of active growth be accurately determined for each species, the bark of which is peeled, in order to determine the exact limits of bark peeling season.

A thorough study of the growth of trees will also furnish much-needed information to the legal profession. Many legal decisions concerning boundaries and titles hinge on the question whether each growth ring represents the growth of one season, or if fictitious rings are sometimes formed. The writer examined a large number of Pitch Pines and Chestnut Oak trees and found that fictitious rings are regularly formed when a prolonged resting period occurs within the growing season. Hence, in some cases two rings represent the growth of a season, instead of one annual ring.

THE OLD AND THE NEW

Not an evergreen tree decorated with candles but a Pitch Pine with its characteristic erect new growth.

The problem — WHEN TREES GROW is not only of technical interest and economic value but might be used as a means of developing real tree appreciation among the children of our public schools. The best soil in which to plant love for trees is the heart of childhood and womanhood. The present lack of a fuller appreciation and a more compelling warmth towards the out-of-doors in which we daily move and often toil is largely due to the kind of education practiced in the past and still retained in a few ultra-conservative communities. It is pedagogically criminal to instruct the boys and girls of the United States concerning the Eucalyptus trees of Australia, the Big Trees of California, the Yew trees of England, and the Cypress trees of the South without mentioning the White Oak, Chestnut, Tulip tree or White Pine which may stand near the schoolhouse door. And merely to mention the names of these trees is not sufficient This simply serves as an introduction, but if the children are also instructed concerning their growth and other activities they begin really to know these trees, and will continue to observe and study their habits.

WE WANT TO RECORD YOUR MEMORIAL TREE PLANTING. PLEASE ADVISE THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

CENTRAL PARK TREES STARVING TO DEATH

BY CHARLES LATHROP PACK

PRESIDENT, AMERICAN FORESTRY ASSOCIATION

TREES in Central Park, New York City, are starving to death. Four thousand or more have died since 1917. Three thousand of the dead have already been removed, the others will be taken out in the next few months. Hundreds are dying now and many of them may be considered a total loss. Some of the weak and sick are to be given special treatment in the endeavor to save them and they may be saved.

Various causes contribute to the present deplorable condition of the trees in this famous park of the largest city in the United States, causes which in one way or another affect tree growth in a great many city parks throughout the country. What has happened in Central Park may happen in many other parks, and the measures being taken to save the stricken trees which remain should be carefully studied by park commissioners and city foresters of other cities in order to aid them in overcoming similar conditions which may exist under their jurisdiction.

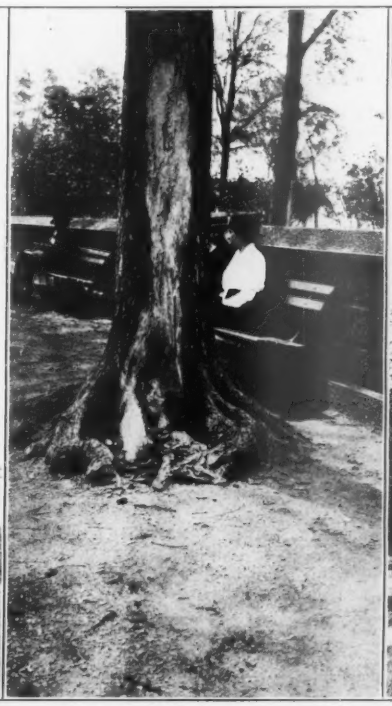
The American Forestry Association engaged two expert foresters to make a careful examination of the trees in Central Park, the soil and the climatic conditions, the selection of species for planting, and methods for bettering conditions of the unhealthy trees which remain standing, and their report indicates that much can be done to improve the situation.

Park Commissioner Francis D. Gallatin and City Forester J. S. Kaplan have, for several months, been closely studying the causes which result in the failure of certain species of trees to thrive and they have already adopted measures to improve soil conditions and provide the trees with more nourishment. This will undoubtedly be effective in many instances but it will not be thoroughly effective because of the fact that some species of trees, planted many years ago, are not suited to withstand the hardships which they encounter in the park. The relief measures will aid them, but, perhaps, only temporarily, while permanent relief may be obtained only by the removal of such species as will not thrive and their replacement with trees so hardy that they will withstand both the soil and climatic conditions which make careful selection of species and great care of those selected imperative.

There are some 60,000 trees in the park and about 4,000 of them were killed during the Garfield winter,

DEAD WHITE ASH

An example of the effect of hard packing of the soil about the roots, dense grass sod, and full exposure to sun and wind. This tree is near 72nd Street and 5th Avenue and by proper care could doubtless have been saved.



NOURISHMENT LACKING

A typical surface soil condition along Fifth Avenue. Note the shallow spreading root system and hard packed soil about the base of the tree, one of the conditions which lead to the starvation of the park trees.

DEAD LINDEN

This tree of fine dimensions was killed by the bad surface soil conditions. This part of the park is often thrown open to children and other visitors for play and the earth is hard packed wherever it is not grass coated.

1917-1918. While the cold was severe, zero weather continuing for a long period, the trees which died would, in the large majority, have withstood the winter had they not been weakened by long years of malnutrition.

The chief handicap which species with a deep root system have to face is the fact that the soil in Central Park is only from two to five feet deep and that at a depth of five feet there is a heavy clay which the roots cannot penetrate. Consequently, when a tree reaches an age at which its roots should go deeper than five feet the clay prevents penetration and the trees lack sustenance.

In many cases the experts making the examination for AMERICAN FORESTRY found that trees would be greatly aided by the earth at their base being broken up. Numbers of trees were being choked by the hard earth covering their roots or by heavy grass growth close around them decreasing their nourishment.

DYING TULIP

The soil about this tree was packed hard by the constant playing of children and the grass kept using up the soil moisture beyond the bare ground. The tree is slowly dying.

DEFOLIATED BEECH

This 22-inch tree was an out-crop of rock. The soil packed hard and exposed to full sunlight about the roots makes it impossible for the tree to thrive.

A YELLOW PINE

This tree suffered from a shallow soil, a windy site, and exposure of the soil to direct rays of the sun. The result is stunted development and early death.

Climatic changes, smoke and dust also undoubtedly adversely affected the trees but these are conditions which cannot be overcome and trees hardy enough to cope with them should be planted whenever new planting is undertaken.

THE DEAD AND DAMAGED.

Of the 3,000 dead trees removed in the last two years the greater number were Oriental plane trees which had been frost cracked and killed by the 13 degrees below zero weather of the Garfield winter. Next in number of dead were the elms, third came the oaks and Lombardy poplars, fourth, the lindens and last, the maples and several other species.

There are a great many varieties of trees suitable to park planting and practically all of them vary in some way from each other in their requirements of soil, moisture, etc. Let us look over several species commonly found in Central Park in regard to their soil and moisture requirements. Take the elms. In general, the elm is one of the species found most often in Central Park. It is used on the outer edge to shade the walks surrounding the park, on the Mall, and often is met with throughout the interior. Many of them are rapidly approaching death. The once famous cathedral aisles of elms along the Mall have gone entirely, and along the borders of the parks on Fifth Avenue, Eighth Avenue and the two end streets of the park one can scarcely find an elm of healthy appearance. The other species of elm have apparently withstood the strain better but they, too, are seldom to be found in strikingly vigorous condition.

Being so much used, the elms' ability to endure the very trying conditions in Central Park is of great importance. Let us see what the requirements of the elm are for best development. A well known authority upon dendrology writes of the elm: "It never occurs (naturally) on dry upland (on account of root habit). In the juvenile stage the root is shallow and spreading, rarely reaching a greater depth than three feet six inches the first year, while the shoot may be twice as long. A

typical swamp type. At maturity the root system is wholly superficial, rarely penetrating the soil to a greater depth than two and one-half feet. The tree attains its largest size and best proportions on deep, moist, fertile bottomlands. It does particularly well on fine silt and clay lands that retain the moisture in the surface layers, so that till soils and uplands soil that retain moisture in the surface layers will support this tree. The soil is not important where the moisture conditions are suitable." From this it can be seen that the elms are able to grow well in Central Park, but it is not as a whole a very good site for it, much of it being upland and not too well watered. The elms growing there, therefore, would be living nearer the boundary line between sickness and health that would be the case with some other species, and a sudden succession of changes in growing conditions or found entirely defoliated but frequently thin crowns are apparent. English oak, red oak and scarlet oak were found in excellent condition although some showed signs of deterioration by being stagg-headed, *i. e.*, with dead tops.

The beech is another heavy sufferer. In fact if anything it has suffered even more severely than the elm, only not being plentiful it strikes the attention less. The beech does best on a deep, rich soil, but any soil with plenty of moisture in the central layers will maintain it.

The Oriental plane tree, or sycamore, is a common tree in Central Park, and an excellent one for such planting, being bothered by very few insect or fungus attacks, and being very hardy. It is badly injured by severe frost, however.

The lindens are often to be seen in the park, but are not

ALMOST DEFOLIATED BEECH

Note thick grass about the tree and the exposure to the full light of the sun from the direction of the camera—the southeast—where the chief sunlight comes from resulting in the depleted vitality of the tree.

DEAD ELM, FINE OAK

The elm is in typically "park" conditions, open to the sun and wind and with grass about the roots. The pin oak has half of its roots protected from sun and wind by the natural undergrowth of the forest.

POOR AUSTRIAN PINES

In general none of the evergreens do very well in the trying conditions of Central Park. Note the short tree in the dense grass. No really fine and strong Austrian pine was found in the park.

attacks from insects or fungus enemies would have a very severe effect upon them.

Another very common tree is the pin oak. To quote from the Manual of the Trees of North America, by Sargent: "Borders of swamps and riverbottoms in deep, moist, rich soil" are the sites best suited to this tree. It is self-evident to anyone who knows Central Park that the pin oak will only occasionally find such sites in Central Park. This tree also, then—as situated in much of Central Park, must be growing under a handicap and therefore will be more easily injured by changed or injurious conditions. At the present time it is seldom as hardy under city conditions as a number of other trees, requiring for best development a deep, rich, fertile, moist soil. It is also much subject to insect attacks.

The Catalpas are trees of great vigor of growth, and are often met with in Central Park. They also do best on a deep, rich, moist soil, but having deeply penetrating, wide spreading root systems, they are less affected by surface drying of the soil than many other species.

One of the most beautiful of all the trees in Central Park is the tulip tree or yellow poplar. Growing to a great height and with deep, wide spreading roots, it will do splendidly on soils that are not too shallow and which

DEAD TREES AT SOUTHERN END OF THE RAMBLE

On this slope, which was made up of a fairly heavy clay soil with rocky outcrops nearby, there were dead hickories, red maple, tulip tree, and pin oaks, all of about the same size and pretty close together. Note the tops of the dead trees against the sky.

are not too dry. Its best growth is on rich, fertile, deep soil.

A tree with much the same kind of root system as the tulip is the cucumber tree. Naturally the species is only found on deep, moist soils, and when so placed grows into a tree of large size and great beauty. It is found in several places in Central Park.

The silver maple is very common but is a poor tree on account of the brittleness of the wood, being often badly injured by winter storms. It is a poor tree to plant, but a number of them are found in Central Park.

Another common species of tree often met with in Central Park is the Norway maple. This is a species from Europe and is the most hardy and most resistant of all the maples for city planting. It should, therefore, do well in Central Park.

There are a number of hard maples in the park, and they make a handsome ornamental tree. The species requires for its best growth plenty of moisture in the surface soil and preferably a great deal of humus in the soil also.

FINE ELM STRANGLED BY THE SIDEWALK

The space about the trunk is only about two and one-half feet wide, and the asphalt sidewalk and drive have smothered the roots. This fine old tree is on the corner of 59th Street and 5th Avenue, and, with proper treatment, would have been a fine shade tree for many years to come.

The red maple which is common in Central Park is really a bottomland tree; at least, it grows best in moist, even in wet soils, although it also is found on uplands. It is apt to suffer from lack of moisture when planted away from streams or lakes.

Horse chestnuts and buckeyes are very frequently encountered in Central Park. Their natural site is along streams and on rich bottomlands with plenty of moisture in the soil. They are living under a strain whenever they are planted on dry sites.

The honey locust and the black locust, also found in the park, are both trees with deep, wide spreading roots, and able to grow on a great variety of soils, the latter being especially able to stand very hard conditions. For the best development, however, they both need deep, fertile, moist soil.

Scattered occasionally through the park are the botanical freak trees called the Gingko or Maiden Hair tree. This species comes from China and is in America entirely free from all enemies and fungus or insect world. It is very hardy and will

ALL THAT IS LEFT OF THE FAMOUS CATHEDRAL AISLES OF ELMS ALONG THE MALL

The young elms on the right without foliage are recently planted, and should come out in one or two years like the small elms on the extreme right. But the condition of the large elms on the left—which have not reached the age limit for this tree makes the planting of more of the same species on the same site open to question.

A CLUMP OF WHITE PINES

Shallow soil—a rocky outcrop was only about 75 feet away—exposure to wind and to the direct rays of the sun, no shading of the ground under the trees, all work together with the dust-laden air of the city to stunt and kill these trees which are capable of making splendid growth on a favorable site.

grow well almost anywhere. It is a very striking tree in general appearance, and one of the best of city trees.

Another exotic species is the Ailanthus, or Tree of Heaven, also from China. Like the Gingko, this species is very hardy and will thrive where most other species would die. It is even more hardy than the Gingko, and is doing well in the park.

The wild black cherry is very commonly found in Central Park, especially in the northern portion on the forested sections. It will grow on many varieties of soil, and the moisture conditions are not exacting, but they must be uniform for the tree to attain large size.

The white ash is also a common tree in Central Park and its crown is frequently thin owing to the hard conditions it has to face. It is a tree which is rather exacting in moisture requirements, but will reach large size when it is on a well-watered, porous soil.

The common cottonwood often encountered in Central Park is another tree with a good deal of capacity for standing city conditions as long as it has plenty of moisture in the surface soil. Its soil requirements are much less important than its moisture demands.

Of the evergreens, none do really well in the dust and bad air of the city, while of the pines, the white pine is often found in Central Park, but it needs abundant and constant moisture in order to attain to its best growth.

The Austrian pine is another frequent factor in the make-up of Central Park scenery. It is hardy and can withstand city conditions fairly well, although, of course, influenced by them to some extent, and is not as healthy in Central Park as it should be.

These species of trees are in general the principal trees met with in Central Park. Now, let us examine the park and see what success has been made in growing them there. Taking them in order of their resistance to hard conditions:

The elm is in a class by itself and how it has suffered is told in a previous paragraph.

The beech, not so plentiful as the elm, has perhaps been more injured than any other species in the park.

Next in order come the red maple, and the lin-

WHERE HEAVY CLAY HINDERS TREE GROWTH

About this little drinking fountain the soil is a very heavy clay—almost like putty. This has been the means of the death of the three trees in the background. The tree on the right has been killed by the placing of an asphalt walk right up to it on one side and from appearances to within a foot or so on the other.

THE ELMS ALONG FIFTH AVENUE

This picture was taken in the second week in September. Note the loss of foliage and the hard packed soil around the base of the trees. There was little or nothing to shade the soil about these trees from the sun.

den. These two trees were rarely found to be in good condition and often were found partially if not wholly defoliated.

A group of four species comes in at this place in the list, tulip, pin oak, white ash, Austrian pine. They were seldom found entirely defoliated but frequently their crowns were very thin. The tulip poplar sometimes had fine form but with small, poor foliage.

Another group contains cottonwood, English oak, red oak, scarlet oak and sycamore, and these in many cases showed signs of deterioration by having dead tops, although many are still in good condition.

THE WHITE BIRCH

Nowhere is the European white birch found really doing well in Central Park and here it had splendid forest floor conditions with plenty of shade and humus, but it did not thrive despite these.

FAST FALLING ELMS

American elm near 59th Street, 15 inches in diameter and planted on an east slope where the full effect of the sun on the ground will be felt most. Note the dense cover of grass about the roots of the tree.

POOR RED MAPLES

This tree was nearly defoliated. The soil was very shallow and there was a large, rocky outcrop just to the left of the picture. Many of the other red maples in the park are like this one.

The last class of all, containing trees which showed little or no sign of any kind of having suffered contained the Ailanthus, Gingko, cucumber, Norway maple, Catalpa.

Deplorable Soil Conditions.

Soil conditions in Central Park are undoubtedly the most severe handicap to the health of the trees. Most common trees desire a fairly deep, well-drained loamy soil with plenty of humus (decayed vegetable matter) mixed in with it, especially in the surface layer of three to six inches. If too loose and sandy the rain water will soon drain off and leave the trees waterless, and if the soil is too heavy, like a fine dense clay, the water falling on it will tend to form pools on the surface and evaporate and be lost to the trees that way. Also a heavy clay soil will tend to interfere with the growth of the roots. Sometimes the soil will be badly drained and will tend to collect and hold too much moisture, having the tendency to smother the roots of the trees by shutting off all air. Then again, the soil may be shallow and will, therefore, tend to dry out very quickly, thus leaving the trees without water. Then the condition of the sub-soil may make a great difference in the tree growth. If the sub-soil is very heavy and impermeable to water and to the roots of trees, it will greatly impede tree growth if it is too close to the surface, or it prevents moisture from coming up from below into the surface soil. Under such conditions breaking up the sub-soil with dynamite has been proved to be effective. Again, hard packing of the surface soil by people walking upon it, covering the soil with cement or asphalt walks or roads will tend to impede tree growth. Now, many of these difficulties and hindrances to tree growth exist in Central Park today. Shallow soil is very common, often only a few inches covering up the rock below. Heavy impermeable clay is also present in places. A hard packing of the soil around the bases of the trees is quite noticeable along Fifth Avenue. And exposure of the soil to evaporating winds and to the direct rays of the sun is everywhere common. Add to this the frequent proximity of asphalt walks and drives and the frequency of a dense sod of grass growing under the trees, and it is easy to see how difficult it is for a tree to secure normally good soil conditions in Central Park.

Now it has been the duty of officials of the Park Department ever since it was organized to know these things, to realize the handicaps with which the trees have had to contend and to take measures to overcome these handicaps. That this has not been done by the Park Department officials in the past is evident by the condition of the trees today and the difficulties with which the present Park Department officials have to contend. The trees would be in much better condition had they been properly nourished. They should have been carefully and skillfully fertilized, the shallow soil could have been enriched year after year and if it had been, the trees would have been hardier, stronger and better able to withstand the rigors of the Garfield winter as well as the climatic changes of the past few years.

in its annual report for 1919, which said, "The New York City parks bear very noticeable marks of the exceptionally cold winter, 1917-1918. In the spring of 1918 it was observed that many trees and plantations failed to put forth their leaves, and as the season advanced it was found that they had died either from the intensely cold winter or from cold weather and weakened condition due to disease. The great privet plantations along Park Avenue, some of them fifteen years old, were practically destroyed. The privet hedge around Claremont Inn on Riverside Drive had to be cut back to within a foot of the ground or entirely replaced. All over the city the privet showed damage in various degrees and it is estimated that the loss of this ornamental shrub alone amounted to $75,000.

A DYING CATALPA

This very large and picturesque catalpa is old and the open situation, grass and exposure to wind and sun is proving too much for it. It will probably last but a few more years.

A TYPICAL TULIP

Note the small size of the leaves, the soil packed around the base of the tree by the visitors and the grass on all sides. The foliage of a healthy tulip is much larger.

A BLACK WALNUT

Standing on the top of a steep rise, surrounded with heavy grass sod and exposed to the full sunlight and wind, the soil conditions for this large American black walnut are very bad.

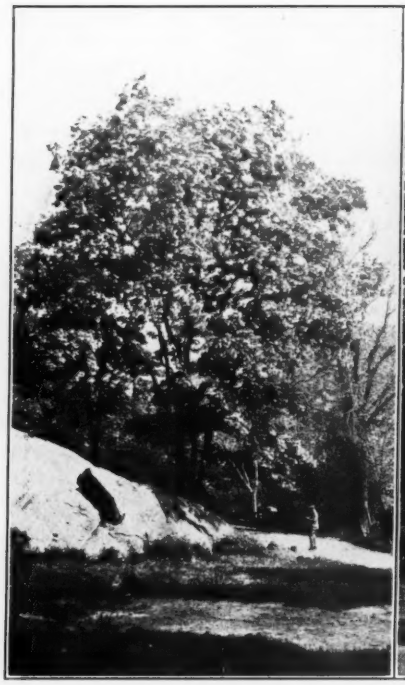
Even the elms, now so pitiful in appearance, could have been given such care, that they would have thrived even under the adverse conditions which they had to face. They have done well in other cities and in other parks where the soil is just as shallow and where they had many difficulties to overcome and they did well because they were given plenty of individual attention.

It is essential in park management that the Park Commissioners and the City Forester should be absolutely free from political influence and should be provided with sufficient funds to do their work well. Political forestry cannot be successful.

Attention was given to the tree losses of the park by the American Scenic and Historic Preservation Society

"Next to the privet the greatest sufferer was the plane tree, or Oriental sycamore. This tree was particularly free from pests and was planted in the belief that it would be immune from winter killing. These trees were largely in the streets where their loss is particularly grievous as it is hard to make trees grow in New York streets on account of pavement, gas leakage, damage by automobiles, etc.

"Other trees which were killed included turkey oaks, horse chestnuts and lindens. In Central Park there were perhaps 400 turkey oaks, 5,000 lindens and 3,000 horse chestnuts. These trees fell easy victims to the weather for they had been defoliated and their vitality sapped for three years in succession by the tussock moth.



TWO FINE HICKORIES

In the northern part of the park there is a good deal of natural forest growth and while some of the trees there have died most of them are doing well. These hickories, as is apparent, have taken hold finely.

HEALTHY RED OAK

The soil about this tree on the West Drive was loose and untramped down. The small fence has had a tendency to keep the people on to the walk. The grass would be better absent from under the tree.

FINE HONEY LOCUST

The honey locust seems to do very well in the park even when the site conditions are not ideal. It would be a good thing to plant more of them, even if they are difficult to prune on account of the thorns.

"The one tree of all the nursery-grown trees in the park that seems to have suffered no damage is the Gingko. Not one has been found to be killed and few have frost cracks. Even the solitary Gingko planted by Li Hung Chang at General Grant's tomb, which is one of the most exposed places in the city, weathered the winter without harm, while the bladdernut tree, planted by the same personage at the same time, immediately adjacent to the park, was all but destroyed.

"In January, 1919, Commissioner Berolzheimer announced that over 3,000 dead trees had been removed in his jurisdiction up to that time."

Relief Measures Adopted.

The Department of Parks makes the following announcement regarding the situation: "Park Commissioner Gallatin has announced, as a result of extensive investigations, a definite programme for the restoration and stimulation of the trees in Central Park.

"Through the acquisition of a 'K' machine for pulling dead trees and stumps out of the ground, it has been found that the basic trouble with the trees in Central Park is the fact that the native sub-soil is of a stiff impenetrable clay, and that the reason trees die after they grow to be about one or two feet in diameter, is because of the inability of the roots to secure nourishment after they reach this clay sub-soil.

"It is very fortunate that we were able to secure a hand-power pulling machine, which made it possible to tear out stumps practically intact, as it discloses this condition very frankly. This situation was known to the planners and builders of Central Park as very frequently in the removal of a stump of this nature, earthen pipes of two inches in diameter are found, which were placed both horizontally and vertically through the clay, and occasionally a large group of boulders was piled immediately under the newly planted tree, designed probably for the purpose of breaking up the clay so that the roots could firmly establish themselves.

"It is the opinion of Forester J. S. Kaplan that unless something is done to remedy this situation, it will never be possible to grow trees larger than from two to three feet in diameter in Central Park.

"Commissioner Gallatin has concluded that sub-surface blasting is the remedy most likely to be successful and most easily and cheaply to be tried.

"As a result of a conference with representatives of the DuPont Powder Company, arrangements have been made to take one lawn in the lower end of Central Park for experiments in this direction. Holes will be drilled about 18 feet apart, and a light charge of dynamite placed in each hole with the object of shattering this cementatious sub-surface clay.

"This practice has been successfully carried out among orchardists elsewhere, and it is highly probable that marked results will ensue from this treatment. This work is to proceed immediately after the leaves fall this year. It is also intended to plant several trees on this lawn in blasted holes.

"If this experiment proves successful it is Commissioner Gallatin's intention to request sufficient money to treat practically all of Central Park in the same way."

A HEALTHY PIN OAK

Note the bushes which shelter the soil about part of this fine young pin oak in the Ramble from the direct rays of the sun. This helps very much in making the tree strong and vigorous as readily seen.

A SPLENDID COTTONWOOD

The cottonwood is a river bottom tree and here close to the Swanboat Pond it has shown its capacity to develop into a beautiful ornament for the park. It is, undoubtedly, an ideal site for this species.

VIGOROUS ENGLISH ELM

The English elm stands the conditions of the park better than the American elm. This tree had very good site conditions for it had been cultivated about the roots which were shaded by rhododendrons.

The Experts' Opinion.

The experts report to AMERICAN FORESTRY that under the head of unfavorable soil conditions they have found in Central Park shallow soil, heavy impermeable clay and hard packing of soil around trees.

Under the head of species especially sensitive to the Central Park conditions they have found elm, beech, red maple and linden.

Trees which will make fair growth in Central Park under specially favorable conditions there they have found to be tulip, pin oak and white ash.

Trees that have demonstrated their ability to do really well in many sections of the park, they have found to be cottonwood, English oak, red oak, scarlet oak and sycamore.

For practically any sites in the park, even the unfavorable places, either the Ailanthus or Gingko can be always counted upon.

The cucumber, Norway maple and Catalpa will all grow splendidly when on their proper sites in the park. Off of their proper sites they will not do so well there.

In regard to meteorological conditions influencing trees during the last twenty years it is clear that:

1. There has been a decided decrease in rainfall.
2. Much of this decrease has been in the summer months when needed most.
3. There has been a decided decrease in relative humidity in the past five years.
4. There has been an increase in the wind movement in the past five years.
5. The trees have been subjected to a very severe frost in the winter of 1917-1918.

With all of these factors before us it is only natural to seek to come to some conclusion as to what the cause of the present situation of the park is and from that to reach out for a solution. Briefly the conclusion as to the cause of the present situation of Central Park, is that no one single, but a combination of causes all detrimental to the successful maintenance of Central Park trees are operating. None of these conditions alone would entirely bring about the present situation and therefore the changing of any one will not cure it entirely. All must be taken into consideration and all must be worked upon.

The Conclusion.

The conclusions reached by the experts follow:

1. Selection of only such species of trees for planting as have proved either entirely hardy under present conditions or at least have done well on certain special sites in the park. This, of course, applies only to the planting of trees on a large scale, specimens of arboricultural interest being entirely another matter.

2. Special attention to the establishment and maintenance of proper surface soil conditions under the trees. It is the soil-moisture conditions of the trees which is the one great thing to watch out for in dealing with trees anywhere and especially in a park where the trees are planted singly and are exposed to severe drying conditions of the surface soil around them. The establishment and maintenance of proper conditions for preserving soil-moisture in Central Park might entail:

(*a*). Cultivation of soil around all trees of special interest or value, and the more the better.

(*b*). Mulching or covering the soil about the trees with manure, dead leaves, etc., during the winter.

(*c*). Planting trees in small groves or "woodlets" and keeping them in the form of small patches of natural forest (leaving the leaves and small twigs to decay on the ground and so form a natural mulch).

(*d*). Underplanting the larger trees with more shade enduring species which would shade the ground, protect from wind and so prevent drying out.

These suggestions would perhaps cost a great deal of money or a change in the principal present-day policy of the park management but is not the end worthy of such expense and change? To anyone passing through the park on any bright day in the warmer months the value to human life—especially child life—of the open, outdoor stretches of natural growth, so different from the narrow, dirty, noisy streets in which most of the park visitors were born and now live, is ample to warrant a great increase in expenditure by the city to save and energetically maintain the tree growth within this, the most famous of all American city parks. At the present time and under the present system many of the trees of the park are much retarded in growth and a large number have died. Some of these latter have been of large size and fair age, but it is clear to the careful observer that practically all of them should have lived for a good many years longer and there is good reason to believe that if proper care and enough money had been devoted to them, they would still be shading the walks and lawns instead of going to the woodpile. Now, when too late the trees are dead and the expense of taking them out and planting new ones comes up, while the public waits for years for the new tree to attain good enough proportions to fill the blank left by the dead specimen.

The situation confronting New York as a result of these findings will, perhaps, fit many other cities in the United States. We have all seen beautiful trees "just die" and the layman is at a loss to understand why they should. The New York park officials are alive to the situation, and are trying to improve it while knowledge of just what is best suited to Central Park conditions is of the utmost value to every city forester and park department official.

PLANT MEMORIAL TREES FOR OUR HEROIC DEAD

THE NORWAY MAPLE

This tree has been benefited by having the soil about it cultivated to some extent and also shaded. More than that, it is not on a windy site. It thrives under these conditions.

THE GINGKO

Note the peculiar outspreading branches. All of the gingkos that were noticed in the park were growing well. There are, in this country, no insects or fungi which attack this tree.

CUCUMBER TREES

These two large trees in the Ramble show the good development of this species under conditions favorable to it. Compare their appearance with others not so well situated.

A POLICY OF FORESTRY FOR THE NATION

BY HENRY S. GRAVES

UNITED STATES FORESTER

AMERICAN FORESTRY MAGAZINE HEREWITH PUBLISHES SOME MORE OPINIONS REGARDING THE NEED OF A NATIONAL FOREST POLICY AND THE KIND OF A FOREST POLICY PROPOSED BY UNITED STATES FORESTER HENRY S. GRAVES. COL. GRAVES' OUTLINE OF THE PRINCIPLES OF SUCH A POLICY WAS PRINTED IN THE AUGUST ISSUE OF THE MAGAZINE AND A FURTHER OUTLINE IS PUBLISHED HEREWITH. FORESTERS, LUMBERMEN AND TIMBERLAND OWNERS THROUGHOUT THE COUNTRY HAVE BEEN INVITED BY THE AMERICAN FORESTRY ASSOCIATION TO EXPRESS THEIR VIEWS ON THIS VITALLY IMPORTANT SUBJECT.—EDITOR.

A NATIONAL policy of forestry seeks the protection and beneficial utilization of our present forest resources, the renewal after cutting of forests on lands not needed for agriculture and settlement, the stability of forest industries and of satisfactory conditions for forest workers, and the restoration of forest growth on lands now unproductive and idle.

The public interests in the continuance of forests justify and require direct ownership of extensive areas, and also participation by the public in working out the problem of protection and renewal of private forests. A program of forestry for the nation should include action by the public through the Government and the States, action by land owners and operators, and the means of uniting the efforts of all for the achievement of a common purpose.

The service of forests is not alone local; it is national as well. For the products are widely distributed without reference to State lines, the industries are engaged in interstate business, and the protective benefits of forests often extend far beyond the localities where they are situated. It is the function of the Federal Government to take the leadership in formulating a national economic policy that gives consideration to the relationship of all forests to the industrial life of the country. The central Government alone can bring about concurrent and harmonious action within given regions. Its research and educational work may be directed to the problems of the nation and of regions that comprise more than one State. Representing the whole Nation, the Government can stimulate and guide local action where individual States by their own efforts would fail. The Government can act to organize all agencies affected by the forest problem in a united undertaking to inaugurate and carry out a program of forestry.

The States have not only the function of handling the public forests owned by them, but they have also a direct responsibility in the protection and continuance of private forests. In this, the Federal Government should take part to meet interstate and national problems, to stimulate action by the States, and to bring into harmony the efforts of the different States. In the problem of private forestry, the Government would work through and in cooperation with the States. The legislation affecting the private owner in the matter of protection and continuance of forests should be by the States. The Government should help the States in formulating plans and developing methods and by direct assistance in carrying them out. The assistance offered by the Government should be contingent upon the States taking legislative and administrative action to provide for the protection and renewal of their forests.

A national policy must recognize the problems of the private owner of forests. Greater security of forest property from fire, better returns from timberland in the long run, and more stable industrial conditions must be sought. A program in which the public participates and recognizes industrial problems, like taxation, would enable private proprietors to handle their forests in a way not to be a public injury but to serve in building up the localities in which they are situated.

Public Forests.

There should be an extensive program of public forests, owned by the Nation, by the States, by municipalities, and, too, by quasi-public institutions and organizations. The public forests today comprise about 25 per cent of the total forest area of the country. They should be extended to include ultimately from 40 to 50 per cent.

In any plan of extensive public holdings, whether Federal or State, provision should be made for returning to the communities a share of the receipts, as is done in case of the National Forests, or otherwise to compensate them for withdrawing the lands from taxation.

The Federal Government should not only provide adequate support properly to protect and develop its forest properties; it should also rehabilitate, by planting if necessary, the depleted and wasted cut-over and burned lands.

DURING THE LAST SIX MONTHS THERE HAS BEEN A GREAT DEAL OF DISCUSSION REGARDING THE NEED OF A NATIONAL POLICY OF FORESTRY AND WHAT SUCH A POLICY SHOULD COMPRISE. DURING THAT PERIOD I HAVE HELD MANY CONFERENCES WITH FORESTERS, LUMBERMEN AND OTHERS INTERESTED IN THE QUESTION IN DIFFERENT PARTS OF THE COUNTRY, AND HAVE PRESENTED CERTAIN PRINCIPLES WHICH I BELIEVE SHOULD UNDERLIE SUCH A POLICY.

I HAVE RECEIVED MANY INQUIRIES REGARDING VARIOUS POINTS IN THE POLICY AS I HAVE SET IT FORTH. I HAVE THEREFORE PREPARED A STATEMENT MORE COMPREHENSIVE THAN HERETOFORE IN ORDER TO CLARIFY THE OBJECTIVES AND WHAT STEPS SHOULD BE TAKEN TO ATTAIN THEM. THIS STATEMENT MAY BE OF INTEREST IN CONNECTION WITH THE DISCUSSION OF A NATIONAL POLICY OF FORESTRY.

HENRY S. GRAVES.

National Forests.

The Federal holdings should be extended by purchase, by exchange of stumpage for land, and by placing under permanent administration forest lands now in the unreserved public domain.

The program of acquisition should seek two classes of forest land:

1. Areas needed for the protection of water resources, to prevent erosion, for recreation and other general public purposes. These should include both virgin forests and cut-over lands.

2. Cut-over lands, with the purpose of insuring the production of lumber and other products and of establishing demonstration areas and centers for Federal cooperation with States and private owners.

The present Weeks Law program contemplates the purchase of about one million acres in New England and five million acres in the Southern Appalachians. This program should be completed as fast as is compatible with public financial conditions, and should be extended to include other important areas needed for watershed protection and other general public service. Lands acquired for protective purposes as well as those for lumber production should be distributed through all forest regions of the country.

The acquisition of cut-over lands by exchange for stumpage would serve to consolidate and block out the National Forests of the West. This principle has already been recognized in several special laws applicable to certain Forests.

There are still forest lands in the public domain which should be added to the National Forests. There are several million acres of such lands outside of Alaska. The great forests of the interior of Alaska should also be placed under adequate protection and administration.

State Forests.

The States should establish public forests, with the same general objectives as the Federal Government, and with special reference to the economic and industrial needs within their boundaries. Many western and southern States still own forest lands received from previous grants from the Government; these should be placed under permanent forest administration, with provision for the settlement of areas suited to agriculture. Lands reverting to the States for taxes or otherwise should, where practicable, be retained and used to build up permanent public forest reservations.

Other Public Forests.

Every encouragement should be offered to municipalities to establish public forests or woodland parks. These may be necessary to protect the local water supplies, or to serve as public recreation grounds; and in many instances they may yield products that will help in a material way to reduce local taxation for schools or public works. Permanent institutions and organizations of a quasi-public character should also be encouraged to acquire forests and handle them on the basis of continued production.

Private Forests.

The safeguarding and perpetuation of forests on private lands are possible through an organized system of protection, through the prohibition of destructive processes that produce waste lands, and through the promotion of constructive and entirely practical measures of forestry. The participation, liberal cooperation, and direction of the public in working out the problems involved are necessary for success.

Fire Protection.

The objectives of fire protection are:

1. To prevent destruction and injury to standing timber by fire.

2. To safeguard young growth already established within the older timber and on cut-over lands.

3. To promote natural reproduction so far as this can be done by fire protective measures.

Effective fire protection is achieved only through a joint undertaking between the public and private agencies in which all lands, regardless of ownership, are brought under an organized system. Such a system requires:

1. An effective service for preventing forest fires and detecting and suppressing those which may be started. Such a service already exists in a number of States.

2. Improvements needed for the prompt detection and suppression of fires. These include roads, trails, lookout stations, properly located stations for rangers, bases for airplanes when these are used, and so on.

3. Measures to reduce the inflammability of the forests. These may consist of lopping the tops, as is practiced in parts of the East; or burning the brush in piles as conducted in many pine stands on the National Forests; or burning over at the proper season cleared areas, protected by fire lines, as in heavy Douglas fir stands; or in felling dead snags, as is required in many National Forest timber sales; and in other measures. In some places fire lines may be desirable, as practiced in southern California; or carefully controlled burning at the proper season of strips and selected areas, as is practical in certain open pine forests. Uncontrolled light burning should be prohibited everywhere.

4. A vigorous campaign of education of the public regarding the danger of forest fires and the need of cooperation on the part of every user of the woods.

5. A systematic campaign of law enforcement, in which all citizens should be asked to cooperate, to punish those who by carelessness or intent start fires or permit their spread.

There should be incorporated in the forest laws of every State requirements to bring all forest owners into the protective system, and to extend it to all cut-over and unimproved lands in the State, together with the disposal, by lopping or burning, of dangerous slashings and other special measures that the local conditions may require.

There should be provided by the State the administrative machinery necessary to carry out the work effectively.

The public should share in the burden of protection. The division of cost will necessarily vary in different States, as is now the case among those States which have inaugurated such a system. The public may properly bear the cost of the State-wide patrol system, including overhead, inspection, lookouts, and similar items, and a portion of the fire suppression costs.

In general, the cost of the preventive system should be shared about equally between the public and the owner of the land. At the present time assistance by the States and the efforts of the private owners alike are inadequate. Measures like brush disposal are essentially a part of the logging operations and should be a charge against it.

The Federal Government should grant liberal aid in fire protection, far greater than at present. Its aid should be contingent on the State's inaugurating and carrying out such a system as above described. This financial help should not exceed in amount that appropriated by the State.

As in fire protection, the spread of dangerous insect infestations and diseases requires the aid and direction of the public. Both the National and State Governments should participate and appropriate liberally to check the depredations.

Forest Renewal.

The renewal of forests on lands not required for agriculture and settlement is an essential feature of a national policy of forestry and an effective program should be worked out in each State, backed by appropriate legislation and efficient administration, which will achieve this object on private as well as on public property. As in the case of fire protection, forest renewal on private lands requires the participation and aid of the public.

There are two problems of forest renewal; first, the restocking of lands already cut over and now in a condition of waste; and second, that of providing for natural reproduction as the timber is cut. Where there is still seed or seed-bearing trees on cut-over lands, continued fire protection may in many cases suffice for restocking. Where there is no chance for natural reproduction, planting or sowing will be necessary. The public will have to take over a large portion of these lands and restore them to productivity. In many other cases owners may be induced to restock their waste lands as a business undertaking.

Provision for forest renewal should be made at the time of cutting. Sufficient restocking of the average private tract can be accomplished by natural reproduction without resort to planting or other intensive measures. On certain types of forest, renewal will result from fire protection alone. In many instances of unrestricted exploitation, however, fire protection alone does not suffice to secure renewal and to prevent the lands becoming waste. If protection alone does not suffice to secure forest reproduction, the owners should be required to adopt such measures as may be necessary to accomplish this, with cooperative aid by the public in working out the problem as a practical undertaking. As in the case of fire protection, the additional measures necessary for forest renewal should be made a part of a systematic program in which the public and private owners engage in a joint undertaking with a common objective.

The first steps in this undertaking are to determine in each region:

1. The circumstances under which fire protection alone will not suffice to prevent wasting of the land under prevailing methods of lumbering.
2. The additional measures necessary to secure conditions favorable for natural renewal.
3. The classes of land upon which forest growth should be continued.
4. The cooperation that should be given by the public to make feasible in practice the measures that may be necessary for the owners to take.
5. The legislation needed to bring these measures into practice, as a part of the State's program of forestry.

As in the case of fire protection, the plan for special measures and for forest renewal should be worked out through State legislation and administration, with the assistance and backing of the Government. The Federal Government should seek to secure concurrent action by the States within given economic regional units, to bring about uniform standards of practice, to conduct experiments and research, to grant material aid in various ways, and to act as a coordinating agent to bring together the different local agencies into full cooperation. The Government should make its assistance to the States contingent upon effective action by the latter.

Measures of forestry upon private lands sought by the proposed program fall into two classes: first, those necessary to prevent the lands becoming waste after lumbering; and second, those which seek a maximum production of timber and other products. The first class of measures should be required on all lands that ought to remain in forest growth. The measures to secure maximum production are of a more intensive character. They should be encouraged in every way but would not be obligatory. They involve a larger initial investment, and they render a larger ultimate return to the owner. Under the second class fall such measures as planting where needed, leaving a larger number of seed trees, cutting in favorable seed years, leaving medium sized trees even though now saleable for a second cut or for cover, various kinds of thinnings of second growth, organization of the forest work on a basis of sustained annual yield, and so on. Experiments should be conducted by the public to establish and make generally known the best practice in each region. Advice by public officers should be freely afforded. Planting stock should be offered at cost by the public. Taxes should be adjusted to encourage owners to undertake the methods found to be most efficient, and other measures of

aid given as indicated in the last section of this statement.

Every encouragement should be afforded to bring about close utilization of timber in the forest and to prevent losses in the handling and use of the manufactured product. This will be accomplished largely through cooperation and research, in bringing information to the knowledge of operators and users of wood products. It is a problem of investigation and industrial education, in which the public should take the leadership.

Public Assistance and Cooperation.

In a national policy of forestry the public itself should assume certain responsibilities and it should assume certain burdens. It should cooperate with and assist private owners in carrying out their part of the undertaking. The measures of cooperation fall under the following heads:

1. *Fire Protection.*—As already indicated, the public should directly share the burden of fire protection, especially in a preventive system and in the cost of suppression.

2. *Assistance in Forestry.*—The public should assist owners in working out plans for cutting that will promote natural reproduction, in planting, and in other measures of forestry. The State should offer planting stock at cost and cooperate with the owners in establishing plantations.

3. *Taxation.*—The States should adopt a form of taxation calculated to encourage good forest practice. The present methods of taxation, with their lack of uniformity in application, often tend to promote premature and wasteful cutting and to discourage forest renewal. To promote action by the State, the Federal Government should assist the States to investigate the current methods of taxation, their effect in causing premature and wasteful cutting and in increasing the difficulties of holding cut-over lands for tree growth, and should assist in drafting model tax laws applicable to various forest conditions.

4. *Forest Loans.*—Existing legislation concerning farm loans should be extended to include loans for the purchase and improvement of forest lands, to encourage the holding of lands previously acquired, where the purpose of the owner is to hold and protect cut-over lands or those having growing timber, to reforest lands by seeding or planting, or to use other measures in promoting forest production. To obtain the benefit of such loans, which should be for a maximum period of 50 years, the land owner should enter into a specific obligation to retain the land in growing timber and protect and care for it during the life of the loan.

5. *A Survey of Forest Resources.*—Funds should be provided whereby the Federal Government in cooperation with State and private interests may make a survey of the forest resources of the country. This would determine the quantities of timber suitable for different industrial uses, the current consumption of forest products, the probable requirements of the different regions for material, the possible production of the forests by growth to meet these requirements, and other matters which will aid in developing the national forest policy.

6. *Land Classification.*—The public should cooperate in land classification to aid owners to put their lands to the most productive use. The public should aid in bringing settlers upon lands suited to agriculture, discouraging speculative undertakings that lead to the deception of innocent investors and efforts for the colonization of lands unsuited to the purpose. Land classification would indicate the classes of lands which should be devoted to the production of timber, either permanently or pending a development which would make possible their successful settlement.

7. *Research Work.*—Adequate funds should be provided to enable the Government and other public agencies to carry on investigative work needed in carrying out a national policy of forestry. This would include investigations on a larger scale than at present in determining the best methods of forest practice, and also research in forest products.

The National Program.

A program for the nation must be an aggregate of local programs adapted to different conditions, and correlated and standardized through the Federal Government to meet the broader requirements of the whole country. A national program cannot be put into effect in its entirety at once. Local programs will also probably have to be worked out by steps. Some States are already able to go forward more rapidly than others, partly because of their financial strength and partly because experience has already demonstrated the methods of protection and forestry required to secure results on the ground.

The initiation of a national policy of forestry requires as one of the first steps the passage of a Federal law that recognizes its objectives and provides authority and means for the Government to extend cooperation with the States in the protection and perpetuation of the forests under their jurisdiction along the foregoing lines. At the same time, Federal appropriations for the purchase of forest lands should be greatly increased.

Much can be accomplished pending such a law. Thus, there should be at once a joining of hands in a most vigorous campaign for fire protection, that will educate the public to the dangers from fire and lead to more effective action in all forest regions. Individual States should go forward with plans for better legislation and larger support of forestry. But the passage of a basic Federal law with the aid that the Nation can offer would make possible the inauguration of a policy that would secure results impossible without such national action.

A PROGRAM FOR PRIVATE FORESTRY

BY H. H. CHAPMAN

PROFESSOR OF FORESTRY, YALE FORESTRY SCHOOL

THE agitation for securing forestry practice on private lands is due; first, to the rapid destruction of the forests on lands privately owned, a nation-wide condition; second, to the growing need for forest products; third, to the inadequacy of the method of public ownership of forest lands to solve the problem on a quantitative basis, because of the small percentage of forest lands publicly owned.

I believe absolutely that public ownership and management is the best method of growing timber, and this is generally admitted by foresters and economists. But owing solely to the expense and slowness of the process of acquiring title to lands now owned privately, foresters are seeking means to check the destruction of forest values on private lands and preserve their productiveness.

Private owners have a keen appreciation of forest values of all kinds, including stumpage value of merchantable timber, protective value of forested slopes, aesthetic value of parks, and even commercial value of half grown timber. But their general desire is to realize or cash in on these values by sale of property or timber, or by turning the forest products into cash. In the process, the forest as a productive "plant" or property is wrecked or gutted as effectually as the Huns stripped the factories at Lille—and it takes just about as much patient investment and far more time to restore such forest property to productiveness.

Lumbermen, especially sawmill men, representing as they do the *business* of converting forests into cash, conduct their business logically on this basis and as a class are not interested in what becomes of the land as *forest land* after cutting. Most of them will admit this and justify it. Many are interested in forestry, provided they themselves do not have to practice it. Most of them resent, and desire to avoid, criticism for this policy, but since it is the logical economic plan for them to pursue as far as they have been able to figure it out, they go ahead on those lines, cutting out their stumpage, and abandoning the worn out mill and plant on completion of the cut.

For this policy the lumberman need not be considered either crazy, stupid, or criminal. He is a good average, short-sighted American, differing in no way from other operators who desire to skim the cream of a project, and with far more logic behind him. It pays the farmer who *owns* his soil to maintain its fertility, but the renter often resorts to skimming. It pays any business to adopt methods for securing permanence, with reduced depreciation and labor costs and greater efficiency—but the lumberman has not been able to compute the profit in maintaining and renewing his raw material by the slow growth of the forest species, which does not keep pace with his mill capacity, based as it is on large output and low *manufacturing* costs.

Self interest and public interest do not always coincide, but they are seldom diametrically opposed. The public benefit requires the curbing of selfish activities, and this usually results in the curtailment of immediate financial profit whose acquisition would result directly in public loss perhaps of a permanent character. By this curbing of greed, a business may even be made unprofitable. This usually indicates that the public benefits of this business do not offset the injuries and damage resulting from its conduct.

If a business is necessary to public welfare, which is the only excuse for its existence, public regulation will soon cause an adjustment which makes it possible to continue as before, and usually at an equal profit.

The short-sighted policy of utter destruction of private forest property, like the placer gold mining of the west, may have to be terminated in the public interest, for several reasons. We will continue to need forest products, grown on these lands, after the present supply is exhausted, if we are to continue to enjoy our present standard of living and not retrograde like the Chinese. Waste land incapable of agricultural use is an economic plague spot in a community, which can be cured by restoring forest values. Productive land, whether forest or agricultural means taxes, roads, schools, population, markets, prosperity and character. The reverse means poverty, lack of transportation, ignorance, degeneracy, insanity, and pauperism. If the reader does not believe this it is because he has never investigated conditions where such causes have operated for two generations. Those who destroy forest values create prosperity during their operations, but insure a permanent condition of destitution to follow.

We are passing through a transition stage in this country, when the process of skimming our national resources, soil, forests, and minerals, is giving way to permanent ownership and management. What is the lumberman going to do with his skinned forest land in the future? The process of selling it off to prospective settlers as agricultural land will be more and more curtailed by the interference of the same public interests, which, slow to awaken, now bid fair to adopt the principle that land must be suitable for agriculture before being disposed of to such investors. This is another example of interference with immediate profits, because of public good! Are such land owners going to oppose the educational efforts of the government, and the attempts of states to secure land classification for fear it might prevent them from unloading worthless lands on prospective farmers? The corollary of the operation of skinning the forest is to skin the settler. Yet there is evidence that many such land owners balk at this process, and sincerely desire to find some true values and real uses for their cut-over

lands—*any use except forestry,* for of this they are firmly persuaded that it is impractical, impossible, and unprofitable.

My own belief is that it is going to become increasingly impractical, impossible and unprofitable for owners of forest land which is non-agricultural in character to do anything else with it except to grow timber upon it, and that the process of passing the buck by exchange of ownership does not relieve the purchaser of the problem, nor will it suffice very much longer for such land owners to seek to nullify the efforts of foresters to emphasize these conditions, by applying the damning epithet of "theorist." Those lumbermen who did service in France know that forestry is not a theory. They also know that our economic conditions are rapidly approaching those of France. Foresight on our part is needed as much as it was for the French. They applied it—will we?

Close study of many areas of timber land in the south and elsewhere has convinced me that the skinning process applied to these operations actually loses money to the operator compared with that of reserving a small per cent of the less matured trees, and that reproduction even of Longleaf pine is easily obtainable by the use of simple and easily applied measures of protection. But the average timber land owner does not wish to believe this and looks only at the difficulties. He is not in the forestry game and refuses to enter it or even consider it.

If the cure for this deadlock lies in legislation we must secure the following conditions:

First, the risks of timber production as a business must be reduced. This means better fire protection, better laws for exclusion of tree diseases and insect pests, and better enforcement.

Second, proper tax legislation. This means a workable tax law removing the annual tax from timber, and imposing instead a products tax. We have no workable laws at present.

Third, actual land classification into agricultural and forest lands. If anyone thinks this is easy he is no farmer.

Fourth, capable, trained, non-political state departments of forestry with both the knowledge of forest technique and silviculture which will enable them to advocate intelligent measures of forest regulation, and the power to enforce such measures.

Finally, we may be in position to secure by regulation the measures needed to preserve the forest land from the destructive processes which now characterize private operations.

If we begin at the other end of this chain of development, what do we get? Restrictive measures, of course, designed to force private owners to practice forestry. These measures will be formulated by politicians, or legislators, ignorant of the technique of forest production, and will be almost certainly impractical and calculated to defeat their own ends, like much of the "diameter limit" legislation which seems to be the first thought of such statesmen. Having passed such laws, we will have politicians to enforce (?) them—and they will be evaded or repealed. We will find it impossible to enforce them on land claimed to be agricultural and there will be no authoritative classification of such lands, hence no possibility of actual enforcement. Meanwhile the same legislatures which seek to regulate the owner of land will continue to sanction increasing burdens of taxation on standing timber, and may fail to provide an adequate system of fire protection to insure the survival of the plantations or young timber which they seek to force the owner to raise.

The development of forestry by states has been by no means negligible. Progress has been made in securing good and workable fire laws. Experiments have been attempted in reform of state tax legislation as affecting forests, and a determined effort has been made to keep forestry out of the miasma of party politics. But this latter struggle resembles the labors of Sisyphus, who, as soon as he succeeded in rolling the stone to the top of the mountain, witnessed its smashing descent into the depths. The biggest problem we have in this entire forestry movement is how to secure and keep trained men in charge of state forestry organizations, for without such men, we will never get even halfway up the slope of achievement in the program of securing actual forest production on private forest lands.

LET ALL SIDES BE HEARD

BY R. D. FORBES

SUPERINTENDENT OF FORESTRY, LOUISIANA DEPARTMENT OF CONSERVATION

DO we need a national forest policy, and if so just what form should this policy take? The lumbermen and the foresters of the country seem to be getting together rapidly to solve this problem. Their getting together, however, reminds one of a couple of cats, with their tails tied together, hung over a clothes line. If you don't believe that, read some of the recent discussions in the lumber journals, notably the *Lumber World Review* of Chicago. A great many articles on national forest policy from far abler pens than the present writer's will have appeared in the columns of AMERICAN FORESTRY, and instead of addressing himself to an attempt to shed new light on the subject, he would like to make a suggestion as to one means of remedying the lack of cooperation between the lumberman and the forester in solving this problem.

No one can read the various articles pro and con which have appeared in the press of the day without

feeling that the cause of disagreement between the foresters and the lumbermen is a lack of understanding of each other's point of view. There has been a lot of good time wasted on both sides demolishing arguments that were never raised, or statements that were never made, by the opposition. And as usual under such circumstances, the less a man knew, the more positive he has been in his statements. Lumbering and forestry have been too far apart in the past. It is not at all necessary that every forester be a lumberman or every lumberman, a forester, but it certainly is essential that the forester be acquainted with the basic economic facts upon which the lumber industry rests, and that the lumberman understand the principles of forestry, before either can discuss a national timber land policy in an adequate and constructive way.

To emphasize these truths, there follows a quotation from Professor R. C. Bryant, of the Yale Forest School, who is in the very front of the small group of foresters who have a thorough understanding of the lumber business. He says: "It is one of the weak points in the profession (the forestry profession) that as yet we have not developed forester-economics who can speak authoritatively on the many vital problems affecting forests and forestry. . . . Why are not foresters called into consultation by courts and Government agencies on questions involving tariff legislation, export policy, lumber transportation, and like issues? It is, I think, largely because we have been content in the past to devote our attention to the problems which seem more closely related to forestry and have neglected the broader economic phases of the subject, which did not seem at the moment of so great interest or of such vital importance." On the other hand, to prove the contention that the lumbermen are very inadequately acquainted with the foresters' aims and work, let me ask our lumbermen friends how many of them have ever discussed forestry with professional foresters, or read articles on forestry subjects in the *Journal of Forestry*, which is the official organ of the Society of American Foresters, and reflects current opinion in the profession. AMERICAN FORESTRY has for years, of course, endeavored to place forestry before the public, but its efforts have necessarily been confined to brief and popular presentations; exhaustive and more or less technical discussions were not suited to its purpose. Certainly the meaning of forestry has been sadly twisted by some of the lumbermen when they have discussed it in the past, and this is reasonably attributable to the lumbermen's failure to inform themselves, through reading and study, on forestry subjects.

To remedy this situation why not let us all go back to school temporarily and take an examination on the subject of forestry and the lumber industry? Let the officials of the National Manufacturers' Association appoint a committee, preferably a one-man committee, to draft half a dozen questions regarding the broad economic conditions underlying the lumber industry. Let these questions be such that an intelligible answer to all six can be made in 3,000 words. Let the Society of American Foresters appoint a similar committee to draft six questions on the fundamentals of forestry, which can likewise be adequately answered in 3,000 words. Then let a long-suffering jury of about five men, or any number deemed advisable, be chosen by joint action of the Lumber Manufacturers' Association and the Society of American Foresters to grade the replies received to both sets of questions. Every contestant would be known to the judges only by a key number, and be required to reply to every one of the twelve questions. Allow the contestants access to all of the literature on forestry or the lumber industry that they may care to delve into (for the good of their souls or for the purpose of answering the questions) and require all the papers to be in at the end of a three-months' period. Finally let the associations named or any other good and interested citizens put up a substantial sum in the form of cash prizes, say $500, to be divided among the three best writers. Other details could be worked out very simply, but for the benefit of all concerned the writer suggests that in judging the papers plainness of language and avoidance of technicalities be considered a virtue second only to knowledge of the facts.

I at once hear the sneer of the self-made man, who says: "Some smart aleck from a college can write a better paper than a lumberman who has been knocking out his 100,000 feet a day for the last 25 years. An examination on paper is no fair test of a man's abilities. Put the same college youth at the head of a sawmill and logging job and see how long he would last." In reply, let me say first that it would hardly be practicable to test our contestants out except in some such way as I have suggested. Secondly, let me call the objector's attention to the fact that the United States Forest Service, headed by a technical forester and directed in all of its branches by either technical foresters or men who have grown up with the forestry profession, today administers 150,000,000 acres of land, has charge of about 18 per cent of the stumpage in the United States, and employs some 2,500 men every year. It expends around $4,000,000, and takes in about $3,500,000 annually, and will soon be self-supporting. It is a bigger concern than any lumber company in the world, and in spite of entire lack of precedents it has, within fifteen years, built up a very efficient organization. Any man who has been Supervisor of a million acres of national forest land in the west and has handled successfully the tremendous multitude of details connected with the administration of that million acres is no mere dreamer, but an exceedingly practical business man. The forestry profession is composed 99 per cent of men who have been in the business not over 20 years, and considering their youth and the difficulties which they have encountered, no fair-minded man can deny that they have done much hard and exceedingly practical work. Let us make a test of the foresters' knowledge, as compared to the lumberman's knowledge, of the whole field of forestry and lumbering.

WHAT THEY SAY AS TO A FOREST POLICY;

TREE culture and tree conservation should be taught and practiced.—*Chicago Tribune.*

The American Forestry Association is doing good service in linking the causes of roads and forestation.—*New York Times.*

It is a subject calling for a national forest policy.—*St. Louis Globe-Democrat.*

The statistics are certainly alarming.—*New York Tribune.*

We must plant trees as we plant corn.—*Hamilton, Ohio, Republican-News.*

We still refuse to learn from the countries of the Old World.—*Florida Times-Union.*

An appalling indictment of American carelessness.—*Cleveland Press.*

This is a matter of first importance.—*Rochester Democrat and Chronicle.*

In times of peace the loss of fifty millions in property at a single time would stir the world.—*Cincinnati Times-Star.*

From every side is heard words of praise for the American Forestry Association.—*Chicago Evening Post.*

The increase of trees and shaded highways will add millions to the scenic value of the country.—*Minneapolis Journal.*

Nor have we been able to think of a more lovely memorial than a collonade of trees.—*Cincinnati Enquirer.*

We should seek to have the two improvements go hand in hand—reforestation and road construction.—*New Orleans Times-Picayune.*

The American Forestry Association earnestly aims to promote the beautification of public highways.—*Salt Lake Tribune.*

The American Forestry Association's efforts should be pushed and in the South especially it should be given the encouragement which it merits.—*Charleston, S. C., News and Courier.*

It is to be hoped the American people will take kindly to the plan of the American Forestry Association, not only as a matter of sentiment, but as a matter of common sense.—*Lincoln, Neb., Star.*

Development of a practical highway system and regrowing of our vanished forests are two cardinal points of the *Chicago Tribune's* "Middle West Program" as outlined in a stirring editorial on the need now of waking up and going to it in a business way. Contrasted with the picture the *Tribune* paints is the view of a writer in the London (England) *Morning Post*, who, following a trip to the battlefields, writes:

"It is the silence I can't get over. Heaven knows Chateau Thierry and the villages of the Marne were not silent places in '17 and '18. There were men and noise there then. All round about you on this lonely road are the dancing poppies and above you is the Chemin des Dames with its silent and suffering trees. The trees, indeed, seem to feel the woe of war more than any other thing in nature. Gas almost seems to break their hearts, so sad and broken is their appearance. These pale, withered birch stumps and the joyous, careless poppies are strangely contrasted legacies of war."

IMPROVING THE SCENERY

USE SUNSHINE HAVING OAP
LOTS BETTER SOME
WHEN YOU FEEL YOURSELF SLIPPING USE STICKERS NON-SKID POROUS PLASTERS
USE GO-EZ MOTOR OIL
AROUND THE TURN TURNER'S GOOD EATS
LITTLE PUFFS OF SMOKE MAKE COUNTLESS MILLIONS SHORT — NOT SO IF YOU USE "PHILS FLIMSY" FILM CUT — IT'S SMOKELESS
CHEW CHOO-CHOO CHEWING GUM
ROB'S GARAGE 2 MILES
Brantley

(San Francisco Chronicle.)

With this picture in mind turn again to the *Tribune* which says: "The forests of Wisconsin and Michigan were once the source of great wealth and throughout the Mississippi Valley can be profitably restored and new areas of growth established. The drainage and climate of the middle west call for trees. We know what deforestation has done for such countries as China. The states should include this subject in their public policy and carry on well considered programs suitable to their own conditions. Planting along roads should be encouraged, on hill tops and slopes, and on land less available for crops. Public forest preserves should be increased. Tree culture and tree conservation should be taught and practiced."

For the economic side of forestry we find the editors most keen. From the *Scientific American* we find the *Boston Post* quotes this expression of opinion: "And finally to meet the domestic and foreign demand at the same time, we are clearing out our forest resources at a rate which brings the end of our wood-using industries plainly in sight—not in the next generation, but in this one—not in the next 50 years, but well inside the next 20—and all because we have no government forest policy big enough or broad enough to handle the situation." Commenting upon this the *Post* says: "Surely there ought to be wisdom and energy enough in the land, and especially in its Congress, to act upon these valuable suggestions. Treeless China should serve as a plentiful warning." The *Globe-Democrat* of St. Louis calls for a national forest policy, basing its editorial on figures sent out by the American Forestry Association. "Conservation of our forests still left, and the methodical planting of trees," says the *Globe-Democrat*, "are clearly demanded. It is a subject calling for a national forest policy and the steady attention of Congress. Timber is as essential as wheat for the general welfare of the country, perhaps more so as a fundamental economic matter." In the *Hamilton, Ohio, Republican-News* we find that "we must plant trees as we plant corn." The editor points out that "there are limitless tracts that will grow timber but will not grow food crops, and the scientific preservation of these forests by replacing all cut trees is a form of conservation to which our horse sense ought to direct us to turn without further delay." The importance of forestry to the high cost of living is taken up by the *New York Tribune* which calls attention to the statement by Charles Lathrop Pack on the need of a national forest policy and uses figures in the call, "What Shall We Do About It?" on the front page of the AMERICAN FORESTRY Magazine. "The statistics are certainly alarming," says the *Tribune*. "Of 850,000,000 acres in our original forest area but one-fourth now remains. Nor is an adequate supply being grown. So it is up to the people as individuals. Apparently despairing of getting a national forest policy, Mr. Pack makes an appeal to his fellow-citizens." According to the *Florida Times-Union*, "we still refuse to learn from the countries of the

FOREST FIRES AND "ROADS OF REMEMBRANCE"

Old World the advisability of forest conservation." The value of a forest policy to France is pointed out in the *Evanston, Ill., News-Index*, which says: "If there had been the same ruthless destruction of trees there as there has been here, there would have been little wooded territory left for the emergency in which the future of the nation lay in the balance." The *Ohio State Journal* calls attention to the year by year stand of the Association for tree planting and adds: "War brought an unusual demand for lumber and great areas were stripped to supply pressing needs. If we will not aid in growing trees we should not complain if growing scarcity makes us pay high prices for lumber." Forest fires come in for a great deal of attention on the part of the editors. "In times of peace, the loss of fifty millions in property at a single time would stir the world," says the *Cincinnati Times-Star*, "but we have become so accustomed to colossal figures, that today, we take but passing notice of them. Future generations, however, will take notice when lumber becomes an article more scarce and more expensive even than it is today." In the *Democrat* and *Chronicle* of Rochester, the editor further extends the invitation of the American Forestry Association for expressions of opinion on a national forest policy and in pointing to forest fire losses, adds: "This is a matter of the first importance. There is enough information now in the hands of the government and other forestry agencies to cut down fire losses materially." The *Cleveland Press* calls the situation "an appalling indictment of American carelessness. With the passing of our forests we will lose a great national industry that yearly employs 830,000 people and supplies $1,500,000,000 worth of products." The *Toronto Globe* suggests that returning soldiers be put to work in fire patrols. The *Daily Northwestern* of Oshkosh, Wisconsin, calls attention to grazing sheep and their ability to diminish the fire hazard. The *Houston Post* points to fire losses and says: "It was a stern reminder that provision must be made for better fire protection. The nation will repent its folly in days to come, in exorbitant lumber prices." The *Bulletin* of Maysville, Kentucky, says: "We are destroying our forests much faster than we are planting new ones and renewing old ones. In the case of preventing forest fires, the old adage that an ounce of prevention is worth a pound of cure is particularly applicable, for the cure is a matter of decades." In the opinion of the editor of the *Akron, Ohio, Press*, "forest fires can be cut in two if human carelessness is eliminated." The *Post* of Cincinnati, says that in the passing of our forests the "lumber supply will be in the hands of the timber interests of Canada," and "it does not require many fires, such as now are raging in the northwest, to counteract all efforts at conservation."

As to roadside planting the *Chicago Evening Post* says: "From every side is heard praise for the American Forestry Association for the good service it is doing in linking the cause of roads and forestation. The trees are intended to be memorials for our soldiers who died in France and to their comrades who have come home bearing victory. Roads thus shaded and beautiful are called "Roads of Remembrance." In the *Tribune* of Salt Lake City we find that "this day, fraught as it is with great significance to the people of Utah, seem to be a propitious time to direct attention to the work of the American Forestry Association in its efforts to foster the 'Roads of Remembrance' idea. Roads and the observance of this pioneer anniversary go well together. In 1847 roads were the crying need of those who traversed the great plains and endured untold hardships to bring civilization to these valleys." Speaking of the Motor Transport Corps cross-country demonstration, the *Tribune* continues: "The American Forestry Association is actively interested in the demonstration, its immediate aim being to promote the beautification of public highways by inducing states, counties, and rural communities to line their thoroughfares with trees." The *Journal* of Minneapolis points to the scenic value of tree planting and says: "The American Forestry Association has taken up the idea of tree planting along public highways. Aside from the sentiment expressed and the loyalty that will naturally be stimulated by this action, the increase of trees and shaded highways will add millions to the scenic value of the country and much more in the material value of the trees themselves. It would, indeed, be a blessing to this land if these 'Roads of Remembrance' should cause us to plant in America a tree for every tree destroyed in the war."

"It is to be hoped," says the *Lincoln Star*, "that the American people will take kindly to this plan of the American Forestry Association, not only as a matter of sentiment but also as a matter of common sense." The editor of the *Cincinnati Enquirer* views road side tree planting in this way: "Nor have we ever been able to think of a more lovely memorial of human life nor a more highly appreciated benefaction than such a collonade of trees." In *The State* of Columbia, South Carolina, we find the editor goes into discussion with the *New York Times* as to the value of various trees for memorial highways. *The State* concludes a well-shaded road would tend to allay the speed mania for "no one wishes to dart too swiftly through an avenue of beauty." The *Times Recorder* of Americus, Georgia, points to the hearty approval that has been given the Association's plan.

The *Times-Picayune* of New Orleans points to the campaign of the American Forestry Association to restore our forests and adds: "We realize, even more than the French, the necessity of forests, and it is but natural that we should seek to have the two improvements go hand in hand —reforestation and road construction—and that the idea of planting trees along side the roads should be strongly advocated." The *Republican-News* of Hamilton, Ohio, asks "what better suggestion than that of so-called 'Roads of Remembrance' for memorials?"

REAL SERVICE

Flushing Daily Times.

The announcement by A. E. Davenport, chief of the construction department of the Texas Oil Company, that the fine old elm tree on the Whitestone avenue side of the property of the company has just acquired would not be destroyed, will be appreciated by every resident of Flushing.

That the tree would have come down under ordinary circumstances cannot be doubted. The Daily Times, in calling attention to the matter the day the announcement was made that this company had purchased the property and was planning the construction of a big service station, at once crystallized sentiment in favor of saving it.

The value of the elm as a specimen of its kind is demonstrated by the active interest in its behalf by the American Forestry Association. Although located in Washington and busily concerned with the larger questions of conserving the forests of the country, Mr. Ridsdale did not hesitate to come to the aid of this single tree.

The value of the service frequently rendered by newspapers to the community in which they are located and of the worth of an organization like the American Forestry Association are so clearly demonstrated in this instance that further comment would be superfluous.

"BUILT-UP WOOD"

BY O. M. BUTLER

ASSISTANT DIRECTOR, FOREST PRODUCTS LABORATORY

RESEARCH in forest products, stimulated by war requirements, forecasts a far-reaching movement in the peace-time utilization of wood in new forms. One field of possibilities in particular stands out. In it lumbermen and foresters should be especially interested, because rapid advancement within the next ten or twenty years may be expected, and developments in this field may have a marked influence on the industry and the profession. This domain is the utilization of wood in built-up forms.

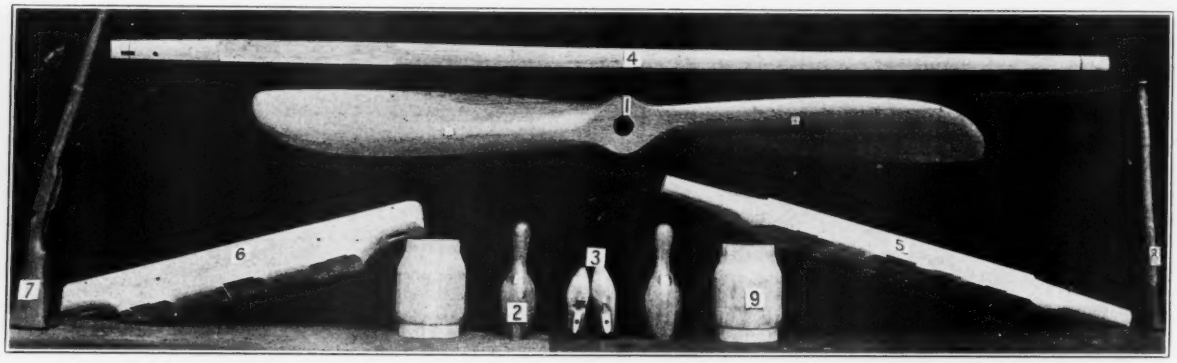
The trend of utilization is already strong in this direction. Built-up wood is by no means new. Before the dawn of history, the Horse of Troy, we have been led to believe, was a built-up wooden "steed of tremendous height," and on through the ages wood has been used in forms that were "built-up" in one sense or another. The term, as here used, however, refers to the fabrication from smaller material of special forms or types of lumber to replace or to serve as substitutes for full-sawn or solid material. Two general methods of building up wood in this manner are now in use; one employs glue, and the other, nails, bolts, wooden pins, and other forms of fastenings, to hold the different parts or laminations together.

Glued laminations are quite widely used for the manufacture of a great variety of material for inside purposes, such as furniture, toys, mill work, etc.; but it has not found extensive application commercially for exterior or semi-exterior requirements, because the ready failure of the glue used when joints became exposed to rain or extreme changes of moisture conditions.

Laminated beams, girders, and stringers are now built up of thin pieces of lumber bolted together and used for structural purposes in the same manner as solid timbers of the same cross section. Tension members in truss design and, in fact, entire trusses have also been built up in the same way. During the war, built-up structural beams were approved by both the National and Chicago Boards of Fire Underwriters to meet the shortage of the large sizes of structural timbers, while lattice trusses of light-weight timber with the principal supporting members made of built-up stock were developed for government use to span walls as far as 100 feet apart. Recognizing that it would be a mistake for lumbermen and architects generally to adopt this form of construction without first having conclusive data as to the efficiency of specific types or standards of built-up designs, the Forest Products Laboratory now has under way, in co-operation with the National Lumber Manufacturers' Association, a series of mechanical tests on full-sized, built-up beams.

A number of factors may be mentioned as influencing this trend toward the larger use of built-up wood. New and more accurate knowledge of the mechanical and physical properties of wood and of the materials and methods essential in perfecting built-up construction is stimulating interest in its commercial possibilities. The knowledge gained through intensive research during the war relative to making glues of great strength and moisture-resistance and relative to methods of conditioning and protecting wooden laminations or parts has turned attention to the possibilities of the exterior use of built-up wood.

A second factor is the regional depletion of forests and the necessity that manufacturing plants in those regions resort to closer utilization of the remaining timber. Experience has shown that in such localities utilization becomes increasingly intensive, while the price of lumber likewise increases, thus permitting forms of utilization involving increased cost to manufacturers. Closely allied to this factor is the decreasing supply of large-sized timber from which solid beams or timbers in structural sizes can readily be obtained. War demands emphasized only



EXPERIMENTS ARE BEING CONDUCTED UPON A WIDE VARIETY OF WOODEN ARTICLES AT THE FOREST PRODUCTS LABORATORY TO DETERMINE THE EXTENT TO WHICH THEY MAY BE MADE FROM LAMINATED STOCK. THE AIRCRAFT PROPELLER IS TYPICAL OF THE SUCCESSFUL COMMERCIAL APPLICATION OF LAMINATED CONSTRUCTION. THE OTHER ARTICLES ARE AS YET PURELY EXPERIMENTAL IN CHARACTER ALTHOUGH THE TESTS ALREADY CONDUCTED INDICATE THE POSSIBILITY OF SECURING VERY SATISFACTORY SERVICE FROM LAMINATED ARTICLES.

too clearly the increasing scarcity of high-grade structural timber and the necessity of providing built-up substitutes that will be practically as serviceable as the solid material.

A third factor—now more potential than immediate in its influence but which in the long run will undoubtedly exercise great pressure—is the growing economic necessity of making the national wood supply go further by utilizing material now wasted and by adopting more economical forms of construction and use.

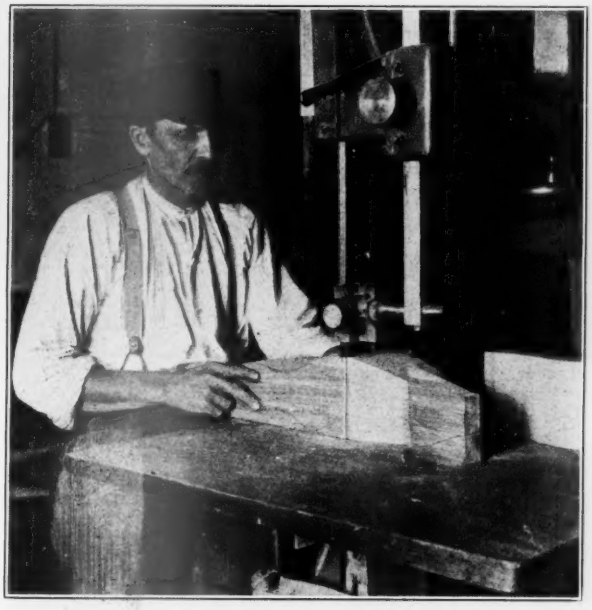
The airplane exemplifies more than any other one thing the possibilities of built-up wood. It represents accomplishment under the propulsion of necessity and intensive application. During the early days of the war and, in fact, even after America's entrance, it has been

BUT LITTLE IS KNOWN AT PRESENT CONCERNING THE EFFICIENCY OF BUILT-UP AXLES AND BOLSTERS SUCH AS THOSE SHOWN IN THE ILLUSTRATION. THEY WOULD UNDOUBTEDLY BE STRONG ENOUGH TO DO THE WORK EXPECTED OF THEM, BUT NO DATA IS AS YET AVAILABLE TO SHOW HOW MUCH RESISTANCE THEY WOULD HAVE AGAINST EXPOSURE TO THE WEATHER AND THE SHOCKS INCIDENT TO USE.

said that 80 per cent of the French propellers had to be rejected before use because strains and stresses in the wood brought about by changing moisture conditions had rendered them practically useless. The propeller probably represents the most refined requirements of glued-up wood from the standpoint of manufacturing practice. It is essential that the propeller be so perfectly manufactured and finished that changing weather conditions will not pull it apart, weaken it, or even throw it out of balance or trackage to an infinitesimal degree. By the close of the war, these difficulties had been largely overcome through intensive studies of glues, protective wood finishes, and the effect of moisture upon wood.

The wing beam of an airplane illustrates another major problem in the use of glued-up wood because it must meet very precise strength requirements. Despite this fact, it was found by experiments that laminations of spruce, glued-up with strong waterproof glue, made a beam which was equal in strength requirements to a solid beam of the same dimension. The United States, England and France had actually approved such beams in their specifications. While laminated beams of many different designs were used to a limited extent by Germany and the Allies during the early years of the war, the advantages of such beams became so apparent towards the end of the war that several of the Allies specified them to the exclusion of solid beams. While there are at present no glues available that are equal to wood in tensile strength, it is possible to join wood so that it will resist tension satisfactorily by making long scarf joints, the area of which is much greater than the cross-sectional area of the pieces to be glued. Likewise, scarf joints are used satisfactorily in beams, where both tension and compression stresses must be resisted. There is, of course, more wastage of material in the scarf.

It will be apparent that the solution of the problems involved in aircraft manufacture has general application in many other directions and the successful development of glued-up wood for exterior use under exacting aircraft requirements forecasts with seeming certainty its ultimate application to the diversified wood-using industries. There is, however, one very vital problem not encountered in airplane manufacture, and that is successful protection against bacteria, to which glued joints are now particularly subject, especially when exposed to conditions of dampness. Recent experiments, however,



IN THE MANUFACTURE OF LAMINATED BOWLING PINS THE MATERIAL OF THE PROPER SIZE AND KIND IS FIRST SURFACED ON TWO SIDES AND THEN GLUED UP INTO A BLOCK AND SET ASIDE FOR A WEEK OR LONGER TO ENABLE THEM TO REACH A STATE OF EQUILIBRIUM.

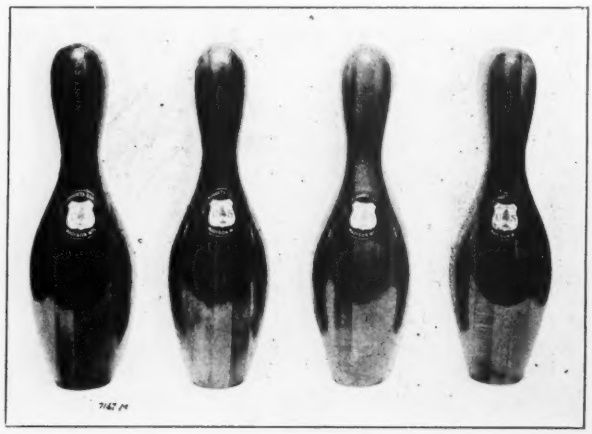
have yielded results which indicate quite conclusively that it is possible to make a glue which will be both waterproof and bacteria-proof without decreasing its strength properties.

The successful use of large built-up columns, trusses, and structural timbers of similar character is more uncertain, on account of the difficulty of designing satisfactory joints and fastenings to meet the tremendous strains to which they must be subjected. Another problem attending their use is the shrinking of the wood after they are put in place and the consequent loosening of bolts and joints. Further refinements in drying practice, however,

should go far toward solving this difficulty. In the experiments now under way to determine the possibilities of various built-up forms for heavy structural use and the efficiency of different types of joints and fastenings, glued laminations are not yet being used, although it is not improbable that when the effect of aging on the strength of glue becomes definitely established, glued joints may find structural application.

IN THE MANUFACTURE OF LAMINATED BOWLING PINS THE BLOCK HAVING BEEN ROUGHED OUT ON THE BAND SAW IS PUT IN THE TURNING LATHE AND TURNED TO THE PROPER PATTERN. AFTER A SUITABLE FINISH HAS BEEN APPLIED THE PINS ARE READY FOR TEST.

For smaller wooden articles, built-up wood has immediate application not only in replacing solid material but in extending the utilization of small sizes and low grades. Some of these possibilities are for wagon tongues, bolsters, wheel hubs and rims, plow beams, sled runners, automoblie bodies, gun stocks, agricultural implements, athletic goods, artificial limbs, hat blocks, ladder rails, shoe lasts, porch columns and outside doors. The Laboratory has already made up as experiments sets of maple bowling pins and shoe lasts, oak wheel rims, wagon bolsters and tongues and walnut gun stocks. These articles are now made commercially from solid wood, but the experiments are in laminated construction, with the use of waterproof casein glue in some cases and blood albumin in others. The bowling pins, under actual preliminary test in a local alley at Madison, gave the same service as the solid pins. The testing of the other laminated articles has not yet been completed.



LAMINATED BOWLING PINS READY FOR TEST. THE TEST CONSISTS OF ACTUAL SERVICE IN A BOWLING ALLEY, A RECORD BEING KEPT OF THE NUMBER OF GAMES PLAYED WITH THE PINS.

While the field for laminated construction of the foregoing character is very extensive, the factor of commercial practicability will undoubtedly time its widespread or general adoption. As a manufacturing process, laminated construction is in a great many cases more expensive than solid-wood construction, and there is an element of waste in the large amount of saw kerf. It would appear offhand that, so long as present differentials in the prices of thin and thick lumber and in various species prevail, built-up wood will have great difficulty generally in meeting competition. But this is not altogether the case and for the following reasons:

1. The drying or seasoning costs are lessened by laminated construction since thin lumber can be much more rapidly dried and with less loss than thick lumber.

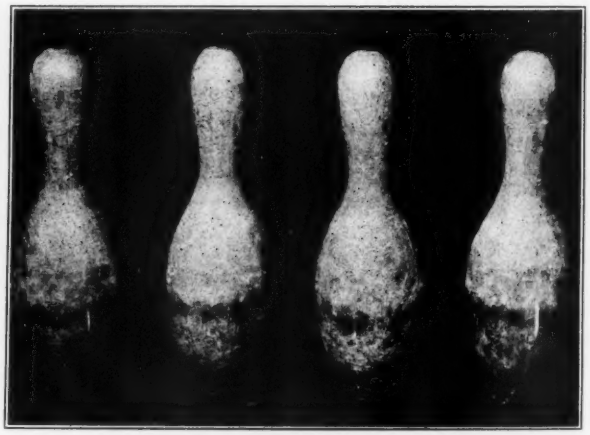
2. The manufacturing loss in solid wood, especially where steam bending is required, as in wheel rims and certain kinds of furniture, promises to be very greatly reduced by laminated construction.

3. Scrap ends and waste material may often be fully utilized in built-up wood.

4. In the manufacturing of certain articles now requiring select high grades, low grades obtained at cheaper prices may be substituted.

5. Built-up wood makes possible better and more uniform seasoning of stock, and this in turn, makes possible a more serviceable article and tends to eliminate price competition.

6. The location of the nation's main sources of timber supply in the far West will tend to make possible the local utilization of built-up wood from other species in eastern and middle western regions, at prices comparable with or even below those of solid wood shipped in from distant regions.



AFTER 250 GAMES THESE LAMINATED BOWLING PINS ARE STILL IN SERVICEABLE CONDITION, IN FACT THIS PARTICULAR SET IS, TO ALL INTENTS AND PURPOSES THE EQUAL OF SOLID PINS.

These conditions, it will be apparent, will have a direct bearing upon the final costs of built-up wood. It is

significant that even under the price conditions existing today a suprisingly large number of laminated articles, by efficient utilization and manufacture, is being produced and marketed in competition with the solid form of construction.

Another factor with which built-up wood will have to contend for its general adoption is that of buyers' prejudice or custom. Custom has a strong hold upon the average person, particularly the rural citizen, in relation to the tools and equipment which he uses in his work. The average farmer, for example, will have to be shown that a laminated wagon tongue or bolster is serviceable and "worth the money." In the immediate development of markets for built-up wood intended to replace solid wood, price competition will, therefore, be necessary to establish the serviceability of many articles.

To the average forester and lumberman a general transition to built-up wood probably appears far distant or doubtful. The limits of its commercial practicability are, to be sure, indeterminate and problematical, but, from the standpoint of satisfactory service, there seem to be no limits to its possible substitution for most forms of solid wood. Even built-up railroad ties and telephone poles, while extreme examples, are by no means beyond the realm of possibility. Further research may be counted upon to make available glues that will be absolutely impervious to moisture and bacteria, and to determine accurately the factors of safety for all different types and forms of built-up wood. It will then become possible to use it with intelligence, economy, and safety. One cannot fail to be impressed by the possibilities of built-up wood as a factor of utilization. Not only would it make possible the saving of a large percentage of present woods and mill waste, but conceivably it would revolutionize beneficially the present milling and grading practices for many species. Select and clear material, the value of which is now lost in under-sizes or discounted by low grade classification, could be utilized and valued on the basis of the number of clear cuttings produced, the method being somewhat the same, only far more intensive; as that now used with the more valuable hardwoods and shop grades of softwoods. This general practice would, in turn, stimulate similar refinement in stumpage valuation and would go far toward valuing the tree on its actual contents of clear material. In brief, the influence of defects upon surrounding clear material would be reduced to an almost negligible minimum, while milling practices would automatically be adjusted to an intensive manufacture either of small-dimension material for laminated manufacture in the wood-using industries or to standardized built-up, ready-to-use building lumber for the retail trade, or both. Furthermore, other species of wood now more or less unusable could be brought into use—eucalyptus, for example, because of the practicability of drying it satisfactorily in small dimensions.

A general utilization movement of the intensiveness suggested above would naturally exercise a direct influence upon the practice of forestry. Instead of managing timber lands on long rotations, the raising of young forests under short rotations would be practicable, and foresters in working out their silvicultural plans would give special weight in the selection of species to their economic value for laminated or built-up use. Short rotations, in most instances, mean greater quantity production, higher financial returns from forest investments, and enhanced soil values, while a wider range of species utilization, which laminated construction makes possible, would tend further to increase quantity production.

TWO TYPES OF LAMINATED SHOE LASTS ARE ILLUSTRATED IN THIS PHOTOGRAPH. THE UPPER LAST IS MADE WITH VERTICAL LAMINATIONS AND THE LOWER ONE WITH HORIZONTAL LAMINATIONS. THESE LASTS ARE USED IN THE MANUFACTURE OF SHOES AND RECEIVE A MUCH HARDER SERVICE THAN THE ORDINARY SHOE TREE. THE SOLID LASTS ARE USUALLY MADE OF MAPLE AND BIRCH AND THE LOSSES INCURRED IN THE SEASONING OF THE BLOCKS AND THE MANUFACTURE OF THE LASTS ARE NORMALLY RATHER GREAT. SEVERAL SHOE FACTORIES ARE COOPERATING WITH THE FOREST PRODUCTS LABORATORY IN TESTING OUT THE SERVICEABILITY OF THE LAMINATED LASTS. WHILE NO DEFINITE RESULTS HAVE AS YET BEEN OBTAINED, PRESENT INDICATIONS ARE THAT LAMINATED LASTS, BUILT UP WITH WATER-RESISTANT GLUES WILL BE QUITE SATISFACTORY.

Forestry has great difficulty in many regions in commending itself as a profitable or desirable financial investment because of the long rotations necessitated by present lumber and utilization standards, but built-up wood would largely remove that difficulty by making practicable comparatively short rotations for all species and the greater utilization of quick-growing and so-called inferior species now discredited with the trade and of low commercial value. It would, therefore, transform many now unattractive forest projects from unprofitable to profitable investments and stimulate the practice of private forestry in all parts of the country.

The utilization of young forests naturally raises many questions relative to seasoning, durability, mechanical properties, etc. One is apt to think that it will intensify drying difficulties on account of the increase in percent-

age of sapwood, but such is not the case. On the other hand, sapwood simplifies the drying problem because of the fact that it dries more easily and better than heartwood. Likewise, the sapwood of most species, excepting that of hemlock, white spruce, and certain fir, takes preservative treatment better than heartwood, although it is not probable that this greater penetration will give greater durability than well-treated heartwood. While in the case of most hardwoods, second-growth young timber is superior in strength quality to older or mature timber, this is not true for all conifers. In fact, the reverse is more nearly the rule, but the differences are not too great or serious to be met satisfactorily by developing methods and standards of laminated construction in accordance with which the required strength for specific purposes will be obtained.

From the broad standpoint of forest conservation, built-up wood justifies thoughtful public and professional consideration. The tremendous annual loss to the nation of wood wasted under present methods of logging, milling and manufacture, is like the weather; it is much talked about but relatively little is done about it. For every foot of wood utilized we have to admit that two feet are wasted in woods, mill and factory. At the same time lumbermen admit that ten years hence the remaining large bodies of southern pine will be cut out. The country's main storehouse of timber will then be the west coast, two to three thousand miles removed from the principal consuming markets of the country. When that comes to be the case, the East and Middle West will begin to feel the full effect on the price of lumber generally of a transportation cost of from $10 to $20 per thousand feet. Furthermore, public measures making mandatory the more economical utilization of our forest resources may be expected in a relatively few years. It is, therefore, wise and forehanded to determine in the meantime the directions along which a sane and sound national utilization policy for the future may be shaped.

"NAPOLEON WILLOW" DYING

HEAVY with memories of Napoleonic glory and whispers of quiet St. Helena, the old tree which came from the aisle of willows at the Emperor's grave some forty years ago as a slender shoot to be transplanted to the Woodside estate of John Morris Phillips is dying. Today it is in the care of the city of Newark, part of the little park at Elwood Place which the Phillips estate presented to the city in 1892, and tree surgeons are busy on the tree, with cement for the gaping cavity at the base of its trunk and all the remedies known to science. But the willow, which has aged early, is world weary, and its wide, drooping branches are symbolic of a fast and steady decline.

In the days when the old Phillips estate, which holds a place in the city's history for 200 years, dominated the Woodside section with its twenty green acres. John Morris Phillips, lover of beautiful trees and shrubs, took delight in putting out new ones from his fine nursery. Besides trees, he had another enthusiasm—Napoleon Bonaparte. Fine prints of the little Corsican, memoirs and documents galore bearing upon his career, were stored up at the Phillips' homestead in a collection that never seemed to stop growing. But one day there came an incident that combined the two loves of John Morris Phillips—a friend of his who had gone on a trip around the world had stopped off at St. Helena and there taken a shoot from the clump of willows that surrounded the great exile's original burial place.

Photograph by courtesy of the Newark Evening News

THE FAMOUS "NAPOLEON WILLOW" AT ELWOOD PLACE

The photograph shows the dying branches on the wonderful old tree.

The young tree was duly set out on the broad lawn facing Elwood Place, and from that time on it was the favorite of old Mr. Phillips. Set in among the elms and maples in what is now a city park, it is still the aristocrat of the lawn. Thirty-five years ago Mr. Phillips died, and the estate today is not of the size that it used to be. Neither have the same understanding hands that cared for the willow been there to care for it in the old way, for the Napoleonic tradition died.

City officials may worry about it—Carl Bannwart of the Shade Tree Department has ordered that it be given special care—attendants may potter around at the broad base of its trunk, and the curious may speculate, but the willow of St. Helena is dying.

TREES AND THE HIGHWAYS

BY PHILIP P. SHARPLES

ROAD ENGINEERING EXPERT OF THE BARRETT COMPANY

A MAN from New England carries through the length of his life a picture of a village street with high arching elms overhead beneath whose grateful shade he was wont to linger on his way from school in the first hot days of June. The elm is still there and ever will be the most attractive tree for highway planting.

Highways are built not for today, but for tomorrow in a long vista into the future. It behooves the engineer of today to look ahead. He can lay out a highway in the most approved fashion and put upon it a surface adapted to the traffic of the minute, but in the end the only permanent part of the way is the location and this our experience tells us is likely to be handed down through the generations to come.

What more fitting gift can we bestow upon posterity than the chance to enjoy roadways well located and lined with noble trees!

The details of tree planting require the co-operation of the engineer, the landscape architect and the forester. Rare is the man who combines the talents of all three and the majority of trees must be planted on an experience and common sense basis.

The engineer must determine the width of the road and the likelihood of change so that the trees may be placed where they will not be disturbed in the future. It is also up to him to tell if there should be planted trees of varieties that give dense shade, or, if such trees should be placed only on the north side of the road, for there are road locations that require sun and warmth to keep their surfaces in traversable condition the year through. It may be necessary in swampy forest locations to ruthlessly cut the trees away from the sides of the road to prevent too much dampness.

The landscape architect must decide the most effective placing of the trees, not alone for the present, but, with his imaginative eye, for the future. He must also decide the kind of tree suited to the view and to the surroundings. Elms may be desired or a quicker growing tree like the maple or the linden. A swampy soil may call for the weeping willow or swamp maple. His problems are numerous, from the placing of an elm in New England to the designation of eucalyptus and palms in southern California. He may even throw up his hands and tell you that neither the giant cactus nor the live oak will thrive and there can be no successful planting without irrigation. The Lincoln Highway has miles and miles of these problems in Nebraska, Wyoming, Utah and Nevada. Nothing but sage brush grows and yet even that, as vegetation, has a charm in the desert.

THE MONARCH OF FOREST TREES

Redwoods on the California State Highway, near Miranda. As Mr. Sharples says, the reconstruction of the battle areas in France is an easy task compared to replacing such trees as these.

The landscape architect has other subjects than trees to consider and, perhaps, the time is not far distant when shrubs and flowers may be considered for our roadsides in our more settled communities.

The hawthorne hedges and the roadside gardening of old England are examples for the future. The possibilities in this country are not indicated in the park work of our larger cities.

The forester (and the arboriculturist is included) must indicate the kinds of trees suited to soil and locality, which ones will stand drouth and which ones water. He must indicate the kinds that must grow in groups for self-protection and which ones can stand alone battling the winds, a sentinel and a landmark on some commanding hill. He too must devise the plans for transplanting and must attend the nurslings until they are established and care for them in the future.

In contemplating the future, let us not forget to save and cherish what we already have. The engineer should attempt to save the noble specimen on a new location, the landscape architect should attempt to utilize foliage already on the location and the forester should attempt

ON THE WILLIAM PENN HIGHWAY, NEAR YELLOW SPRINGS, PENNSYLVANIA

This gives a good idea of what needs to be done to make our motor routes "Roads of Remembrance." Note the most unattractive stretch of barns and telegraph poles on the right of the road.

to save for the future what our ancestors have left us.

The national forest reservations are a wonderful step in saving for the future some of the beauties nature has bestowed upon us. More must be done. The great state highway project should be made to mean more, and in building such highways advantage should be taken of natural beauties that can be preserved.

In Humbolt County, California, a new state highway is in process of construction. It is flanked with noble redwoods dating from before the time of Christ. Unless public sentiment bestirs itself, the trees along this great aisle of the cathedral of the woods are doomed to the saw and the mill. The man-made buildings destroyed in devastated France are easier to restore than one of these ancient monarchs of the forest.

The problems of tree planting and tree saving have only been briefly touched upon. It is to be hoped that the example of France and England may not be lost on our soldiers who have been across and that we may look forward to roads and streets better kept and more artistically treated.

THE COMMUNITY AND ROADS OF REMEMBRANCE

POSSIBILITIES of highway tree planting pointed out by Philip P. Sharples in the article are only limited to the number of miles a road may extend. The community spirit that was reborn of the war may, with the planting of "Roads of Remembrance," be kept alive and bring about a more united country. The great burden of our roads is civilization. A striking example of what may be done is seen in the plan worked out at Dryden, Michigan, by Major-General George O. Squier, chief signal officer of the United States Army. The General took a green scum covered mill pond and converted it into a beauty spot by building a miniature dam. A small club house was erected on the side of a hill. The General demonstrated right in his own home town that the beauties of a place are seldom seen by the people who live there. The result was that the little club house has become a real country club and it is the meeting place of the farmers of that county. The boys and girls of the farm community now enjoy this interesting place. Let our good roads program include such community centers and the planting of memorial trees such as General Squier is going to have planted at his home town and we will shortly have a transformed farming community.

Nearly every State in the Union is alive to these possibilities and various organizations are backing plans for memorial drives and victory highways. The Rotary Club at Bluefield, West Virginia, is one of the first branches of that organization to plan a memorial drive

A BEAUTIFUL STRETCH OF ROAD AT TOPSFIELD, MASSACHUSETTS

This shows the wonderful possibilities for Memorial Tree planting along the good roads now under construction. Compare this picture with that of the William Penn Highway in Pennsylvania.

although the Detroit Rotary Club has planted memorial trees for its members. The Rotary Club of Hamilton, Ohio, is going in for tree planting as a memorial on an even bigger scale for that organization will plant memorial trees for the soldiers of Butler County. Perhaps one of the most unique forms of hearty response to the call of the American Forestry Association for memorial tree planting is found in the *Burroughs Clearing House* magazine. This publication, which goes to the banks and bankers of the country and is devoted to office management and efficiency, gives a full page to "Roads of Remembrance" and urges the bankers of the country to visualize the possibilities for a better country and better business in the building of good roads and their beautification.

Frederick Stuart Greene, State Commissioner of Highways for New York, has outlined a plan whereby his department will plant fruit and nut bearing trees along the roads. On this point Commissioner Greene says:

"The productive fruit or nut from these trees would be ripened at just about the time we now lay off our patrolmen or repair gangs and instead of laying these men off they could be used to harvest the crops which the trees produce and with the number of trucks which the government is now turning over to the department these crops could be quickly and economically transported to markets.

"The yield from trees planted along our highways represents but a small part of their value to the State. There are few things we can do toward lengthening the life of a road more effective than the planting of trees so that the pavement is shaded. On some of our midsummer days it is not unusual to find a temperature of from 115 to 125 degrees on the pavement itself where it is subjected to the direct rays of the sun, whereas the same pavement under the shade of a tree will show at the same time not more than 90 degrees of heat.

By American Photo Service.

PERSHING PLANTS A MEMORIAL TREE

One of the first things (after the cheering) when General John J. Pershing arrived in New York from over seas, was the planting of a memorial tree in Central Park. This pin oak from the Amawalk Nursery was planted as a memorial to the men who lost their lives in the war. The General also planted a memorial tree in Independence Square, Philadelphia.

"It is during these hot days that we most frequently get our sudden showers. The temperature of the water from one of these showers runs from about 65 to 70 degrees. On an unshaded pavement we have, therefore, a sudden drop in temperature from say 120 degrees to 65 degrees, or 55 full degrees. On a pavement protected by the shade of trees we have a drop of from 90 to 60 degrees, or a total of 30 degrees, just one-half the change in temperature of an exposed pavement.

"The stress and amount of shrinkage set up in a pavement which is subjected to the sudden change of 55 degrees are a detriment to any type of road. Further than this, with an unexposed pavement this sudden change in temperature is more gradual, due to the fact that the leaves of the trees retard the water to some extent and the pavement does not get the full rainfall at one blow."

The soldiers, now back from France, are the strongest advocates of good roads for they know their value as perhaps no other one set of men know it.

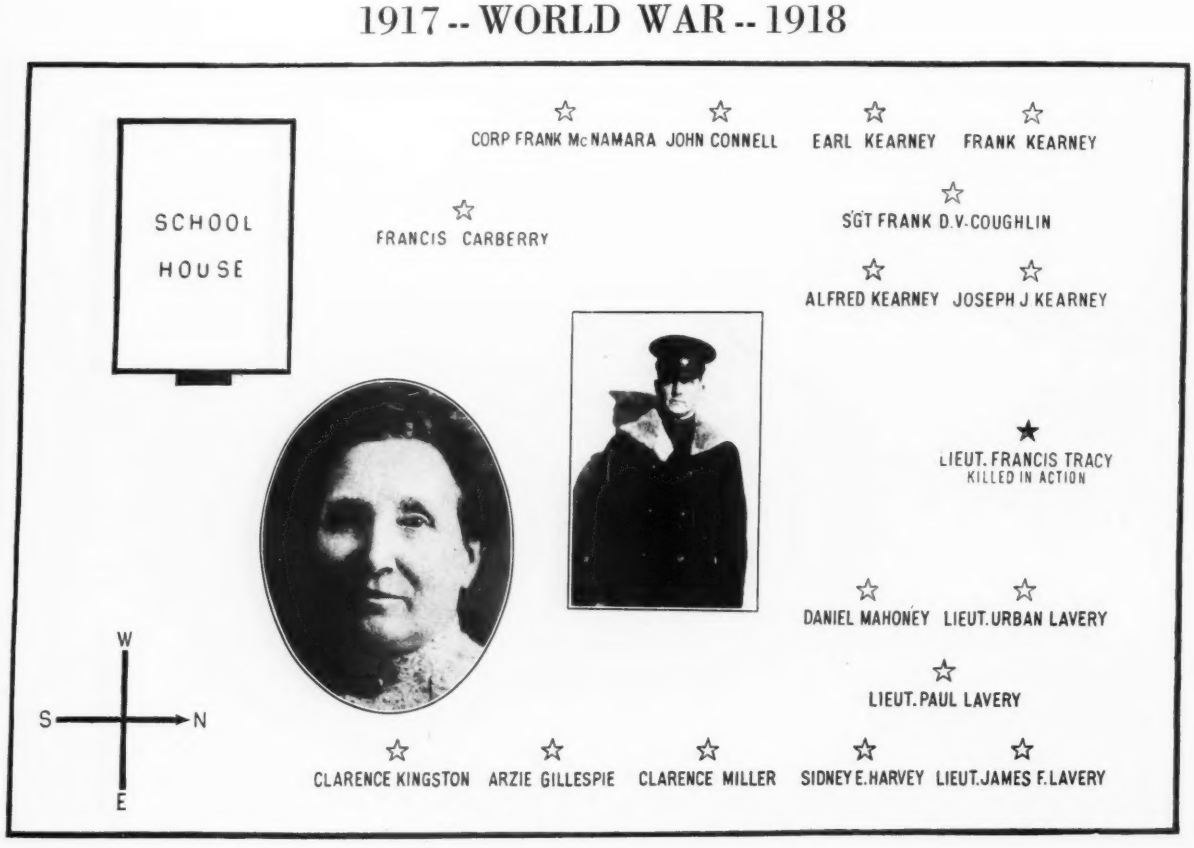
WHAT LARGE MANUFACTURING CONCERNS CAN DO IN MEMORIAL TREE PLANTING

This picture shows the avenue leading to the works of Henry Disston & Sons, Inc., of Philadelphia. The management planted this avenue of Norway maples twenty-three years ago. Why cannot every manufacturing plant in the country plant a memorial avenue in honor of their men who offered their lives to their country?

This point of view is told in the *Amorac News*, which was published by the American Army of Occupation at Coblenz in these words:

"The most urgent necessity of our country is good roads—permanent roads that can be used twelve months in each year. The roads of America today are absolutely inadequate, inefficient, and antiquated. They are not designed to carry heavy traffic. It is a vital problem, this question of good roads, one that reaches down into the very foundation of our social and economic scheme of life, for roads are the clearing houses for the various States and the only means of free travel. Our national prosperity demands that this disadvantage of roads be overcome. This can only be done by honest legislators making laws, the enforcement of which shall be placed in the hands of men who have passed the test, by service in the construction and maintenance of highways."

With nearly a billion dollars appropriated from one source or another for good roads the opportunity for beautifying these roads comes right now. The movement is well underway and growing every day. Many municipalities have planned their own memorial highways or victory drives. In St. Albans, Vermont, for example, a memorial avenue a half mile long has been planted by the Woman's Club. At Bridgeton, New Jersey, a drive has been planted with trees in honor of that town's heroes. These tree plantings are being reported to the American Forestry Association for registration on the National Honor Roll of trees the association is compiling. Street tree planting has been taken up anew and a fine opening for the community spirit is found in the neighbors along a street or a block getting together and deciding to beautify their surroundings. The movement has spread around the world for the American Forestry Association has just received word that New Zealand has plans under way for "Roads of Remembrance" following a meeting of borough council presidents and automobile officials called by P. J. Luke, the Mayor of Wellington. One road under discussion is between Wellington and Auckland, straight across the dominion. Take up the work in your community and start the movement going as a representative of the American Forestry Association.



ACADIA SCHOOL

This bronze tablet (without the picture inserts) is one of the most unique memorials marking memorial tree planting in the United States. The tablet hangs in the Acadia School, at Lavery, Pennsylvania, and each star on the tablet marks where, in the school yard, a memorial tree has been planted in honor of the former pupils. There is one star in gold, that of Lieut. Francis Tracy, who was killed in action. This tree is an oak. The others are maples. Lieut. Tracy was killed in the Argonne on his thirty-fifth birthday. The other insert, Mrs. Annie Lavery Raycroft, was chairman of the dedication committee. From all over Erie county hundreds came to the dedication.

THE LOONS AND GREBES

(Families Gaviidae and Colymbidae)

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

"AS crazy as a loon" is an expression that gains force when one hears the weird notes of one of these curious divers. Beginning low, the strange sonorous sound rises in pitch and increases in volume until it ends with a terrible spasmodic gasp. Heard in

Photograph by G. A. Bailey

A CAPTIVE LOON

This beauty is in summer plumage—in winter it is gray above.

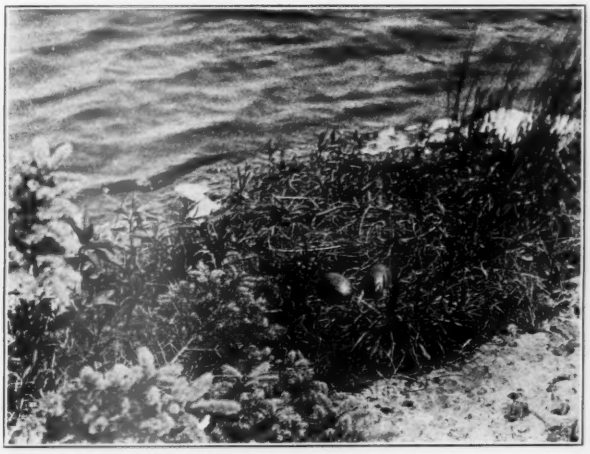
the dead of night when one is alone in the silent forest it has the faculty of arousing one from slumber with a stiffened scalp and strange prickly feeling in the vicinity of one's spine. At other times a pair of birds will hold

Photograph by G. A. Bailey

LOOKS LIKE A SHADOW

But it is a young loon in its characteristic coat of soft black down.

a concert or a single bird will locate a rocky cliff where there is a good echo and will call to himself for hours at a time. The notes are then different and resemble more the insane laugh of an escaped maniac. Those who spend their summers in Canada are familiar with the loons and their ways for it is impossible to camp by the lakes where they nest without being almost continually aware of their presence. Those who do not go to Canada or visit the lake country of northern New England, however, seldom see them. They may not realize that they are present in numbers during the winter on the larger bodies of water throughout the United States



Photograph by G. A. Bailey

THE HOME OF AN EXCLUSIVE LOON

Though fully exposed, this nest on the shore of Georgia Bay is safe. The eggs are inconspicuous because of their olive-drab color.

and along the sea coast, for at such times they are silent and usually keep a safe distance from the shore. On their migrations over land they usually fly high and, because of their large size and long necks, they are some-

A STERN WHEELER

Young grebes resemble their parents in everything but color. Note the lobed toes and the position of the legs at the head of the body.

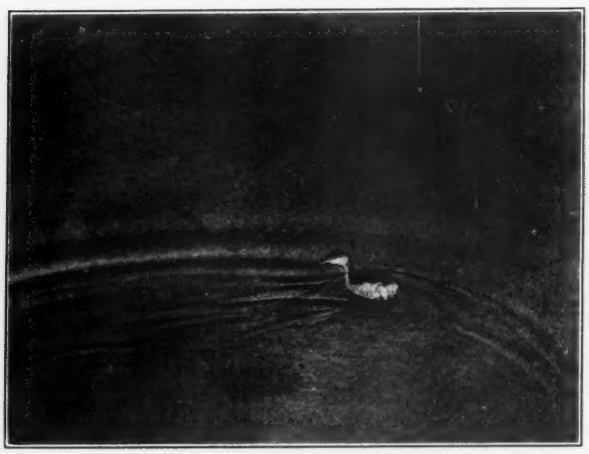
times mistaken for geese, but the flocks of loons never assume the characteristic wedge of the wild geese. Though occasionally there may be a hundred or more birds in the flock, they seem to care nothing for each others company but fly in scattered ranks.

During the winter all loons are colored much alike, being grayish above and white below but, during the summer, they are quite different. There are only five species of loons in the world, confined to the northern

"ALL ABOARD"

One young grebe is just crawling onto its father's back and the other is making haste to follow him.

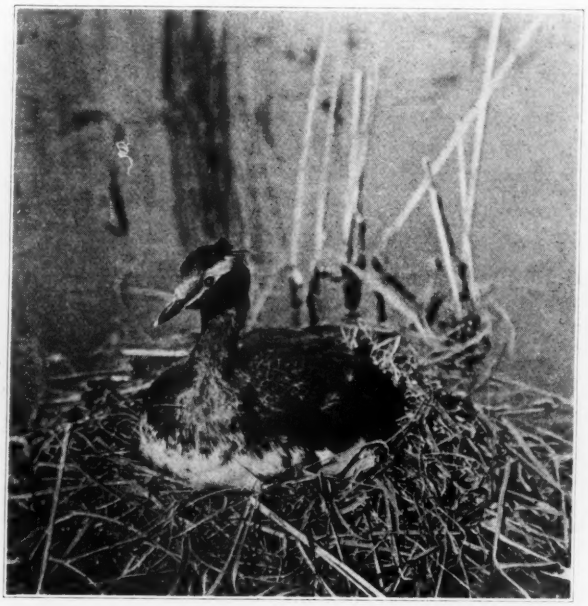
half of the northern hemisphere, and only one of these, the common loon, is often seen. It is black above, the back spotted with white, and there is a half ring of white streaked across the neck. The underparts are white but as it is seldom seen except on the water, the general impression is that of a black bird about the size of a goose but with a shorter neck and a longer bill. The bill is very strong and sharply pointed for it is used for



ON THE BOSOM OF THE CAYUGA

A horned grebe on Cayuga Lake in winter plumage.

spearing the fish upon which the loon lives. The fish captured by the loon are usually small but some occasionally weigh as much as a pound or even two pounds and these are swallowed with much difficulty. The fish are pursued by the loon and speared beneath the water, the strong webbed feet of the bird driving it at such speed that the wings never have to be used unless the



Photograph by A. D. DuBois

A HORNED GREBE AT HOME

All grebes build floating nests from which they can slip readily into the water and disappear.

bird is wounded. The fish are never swallowed beneath water but are brought to the surface and juggled about until they can be swallowed head foremost.

The loon ordinarily lays its two olive-brown spotted eggs in a mere depression on the shore, on a hummock

THE "HELL-DIVER"

Otherwise known as the pied-billed grebe. Note the insignificant tail. It is a graceful bird on the water but almost helpless on the land.

of mud, or a muskrat house where it can quickly slip into the water and dive from sight. The young loons are covered with thick black down when hatched and almost immediately take to the water where they can swim and dive with the greatest ease. Campers often pursue the young birds with canoes in an effort to catch them but it is nearly impossible to do so as they can dodge very quickly and swim for long distances under water. Very often they dive deeply, turn about under the water and swim back under the pursuing canoe until they come up a long distance in the opposite direction.

The red-throated loon is the only other species found in eastern North America and it occurs within the borders of the United States, only as a winter visitant. In its winter plumage it resembles the common loon but is smaller and has the back spotted, rather than streaked with white. In summer plumage it is very different from the common loon as it has gray upper parts instead of black, and a chestnut patch on the front of the neck.

WHERE THE "HELL-DIVER" LIVES

The margin of a mill pond showing the nest of a pied-billed grebe.

The black-throated loon is confined to northwestern North America and northern Europe and Asia and even in winter is a rare bird within the United States. A very similar species, the Pacific loon, however, is common along the Pacific coast throughout the winter. The fifth species is called the yellow-billed loon and it, like the black-throated species, inhabits the Arctic regions of western North America and eastern Siberia. It resembles the common loon but is larger and has a yellowish bill.

THE GREBES

(*Family Colymbidae*)

Closely related to the loons but different from them in many essentials are the grebes or, as they are popularly called, "the Hell-divers." There are twenty-five different kinds of grebes, found all over the world, and six of them are found in North America. All are smaller than the loons, being about the size of small ducks, which, indeed, they very

A CAMOUFLAGED CRADLE, THE NEST OF PIED-BILLED GREBE

Eight eggs lie concealed beneath the debris which the grebe pulled over them before leaving.

THE CAMOUFLAGE REMOVED

The conspicuous white eggs would now be quickly discovered by some hungry crow hence the necessity for concealment.

much resemble. They can always be distinguished from the ducks, however, by their pointed bills, short rounded wings, and their apparent lack of tails which are represented by mere tufts of feathers. Their feet, instead of being fully webbed as in the ducks and loons, are lobed, appearing as though the webbing had been cut between the toes. This does not seem to hinder their swimming or diving for they are fully the equals of their larger cousins, diving so deeply and remaining under for so long that they often seem never to come up. Indeed, when alarmed, they sometimes come up very quietly, letting only their bills show above the water and if there is a slight ripple on the surface they are entirely invisible. This has given rise to many stories of mysterious disappearances and to such popular names as "water witch" and "Hell-divers" already mentioned. When diving they either dive head foremost with a flip of their feet or they settle backwards so carefully as to scarcely leave a ripple on the surface. Such expert divers are they that they prefer this method of escape to flight, especially as it seems to take considerable effort for them to rise. When they do take flight, they ordinarily patter along the surface for some distance before they are able to get up enough momentum to lift themselves from the water. Once on the wing, however, they look a great deal like ducks because they carry their feet straight out behind them and these make up for the absence of tails which would otherwise be a conspicuous difference.

A WATER BABY'S FIRST SWIM

The proud mother grebe is swimming up to encourage her brave little youngster that has struggled from the nest shortly after hatching.

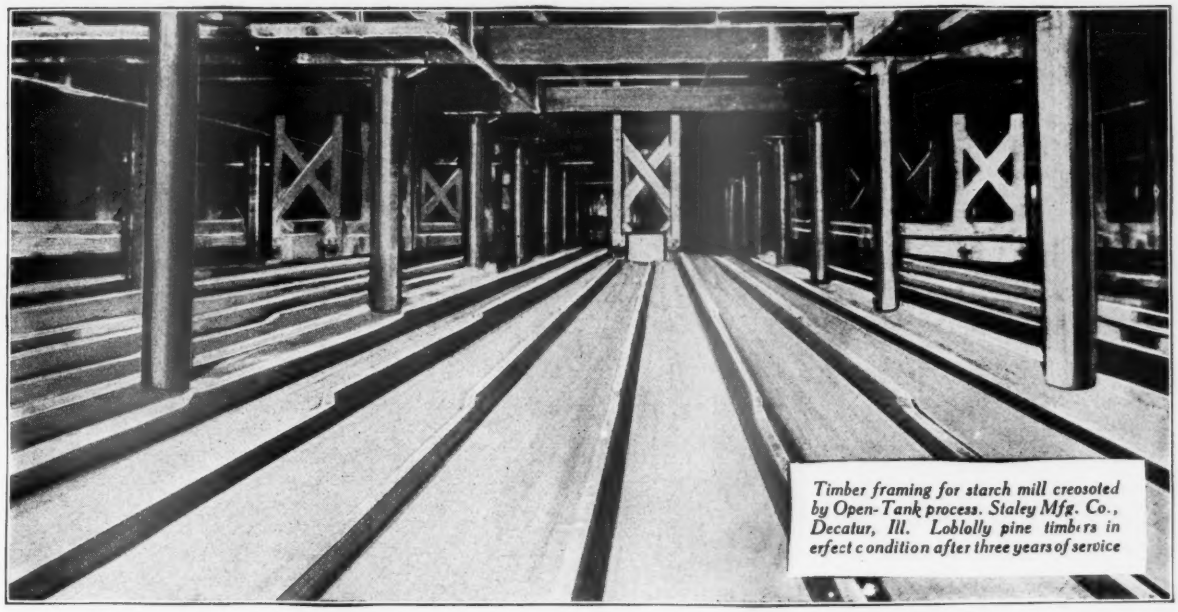
The commonest species of grebe is the pied-billed grebe, an inconspicuous brownish little bird even in its breeding plumage. It is found most often on reed bordered ponds and marshy lakes where it builds its floating nest, anchoring it to the reeds. The nest is but a pile of debris and looks like the little platforms that muskrats sometimes build to rest on. When the bird leaves the nest she always covers her eggs with some of the material of the nest, and, as she is seldom, if ever, surprised on the nest, it was once thought that pied-billed grebes did not incubate their eggs as other birds but depend upon the sun and the heat of the decaying vegetation to hatch them. The eggs are white when first laid but soon become discolored. The young grebes, when first hatched, are curious little creatures, covered with down of a striped black and white pattern very different from that of their parents. They are able to swim almost as soon as hatched and follow their parents about the pond. When they get tired they climb upon the backs of their parents and in case of alarm, the old birds cover them with their wings and dive from sight, coming up among the reeds where they can easily hide. The pied-billed grebes are found in summer from British Columbia to Chile and Argentina, thus having one of the most extensive breeding ranges of any bird, and in winter they occur from Maryland southward.

Another common grebe is the horned grebe, so called from the tufts of yellowish feathers that decorate the sides of the head during the breeding season. In addition to these plumes, it has the neck, breast and sides a rich chestnut and the upper parts blackish, so that altogether, it is a much handsomer and more striking bird than the pied-billed grebe. In winter plumage, however, it lacks all of these bright colors and is merely gray above and silvery white below, the white of the under parts extending on to the sides of the head and making it a more conspicuous bird than it would otherwise be.

In its habits it is not strikingly different from its cousin, for it builds a floating nest and cares for its young in the same curious way. It is a more northern species however, nesting from northern United States northward to Alaska and wintering from the northern states to Florida.

A third and larger species is the Holboell's grebe, a less common bird than the horned grebe, although it has about the same distribution. In winter plumage it is similar to the horned grebe but does not have such white cheeks. During the summer it is conspicuously different for the throat and sides of the head are pure white and it does not have the ear tufts. A somewhat smaller species

(*Continued on Page* 1424)



Timber framing for starch mill creosoted by Open-Tank process. Staley Mfg. Co., Decatur, Ill. Loblolly pine timbers in erfect condition after three years of service

A Lesson in Conservation—

A little over three years ago a progressive engineer saved thousands of feet of timber from the scrap heap, incidentally saving many hundreds of dollars, by using creosoted timber in a starch mill—an experiment looked upon as dangerous by other members of the profession.

The floor framing for the seven floors of the table house, consisting largely of 12″ x 12″ and 6″ x 12″ loblolly pine timbers, would not have justified the cost of laying alone because of its rapid decay under the prevailing conditions.

It was thought that creosoting the lumber *might* harm the starch. Nevertheless lumber creosoted by the Open Tank Process was employed. All details were properly attended to, and the result was a huge success.

The Open-Tank Process: *Simple wooden tank (lined with sheet iron) equipped with steam-coils and small derrick. Upon expiration of the hot treatment, both oil and timber are permitted to cool instead of being transferred to a cold tank. Fence surrounding this plant has been creosoted.*

After three years of use, a length of service which, untreated, this timber would not have given, all woodwork was found in excellent condition.

Barrett B Carbosota Grade-One Liquid Creosote Oil

It was also found that the starch had not been affected the least bit by the creosoting.

Thus, Conservation and Economy were both served, and the non-pressure treatment, properly applied, again proved *worth while.*

Obviously, Carbosota Creosote Oil—the universal standard wood preservative for non-pressure treatments—was used.

(Green wood cannot be effectively creosoted by non-pressure processes. It should be air-dry. In regions of moist, warm climate, wood of some species may start to decay before it can be air-dried. Exception should be made in such cases and treatment modified accordingly.)

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BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

FOREST VALUATION—Filibert Roth	$1.50
FOREST REGULATION—Filibert Roth	2.00
PRACTICAL TREE REPAIR—By Elbert Peets	2.00
THE LUMBER INDUSTRY—By R. S. Kellogg	1.10
LUMBER MANUFACTURING ACCOUNTS—By Arthur F. Jones	2.10
FOREST VALUATION—By H. H. Chapman	2.00
CHINESE FOREST TREES AND TIMBER SUPPLY—By Norman Shaw	2.50
TREES, SHRUBS, VINES AND HERBACEOUS PERENNIALS—By John Kirkegaard	1.50
TREES AND SHRUBS—By Charles Sprague Sargent—Vols. I and II, 4 Parts to a Volume—Per Part	5.00
THE TRAINING OF A FORESTER—Gifford Pinchot	1.35
LUMBER AND ITS USES—R. S. Kellogg	1.15
THE CARE OF TREES IN LAWN, STREET AND PARK—B. E. Fernow	2.17
NORTH AMERICAN TREES—N. L. Britton	7.30
KEY TO THE TREES—Collins and Preston	1.50
THE FARM WOODLOT—E. G. Cheyney and J. P. Wentling	1.75
IDENTIFICATION OF THE ECONOMIC WOODS OF THE UNITED STATES—Samuel J. Record	1.75
PLANE SURVEYING—John C. Tracy	3.00
FOREST MENSURATION—Henry Solon Graves	4.00
THE ECONOMICS OF FORESTRY—B. E. Fernow	1.61
FIRST BOOK OF FORESTRY—Filibert Roth	1.10
PRACTICAL FORESTRY—A. S. Fuller	1.50
PRINCIPLES OF AMERICAN FORESTRY—Samuel B. Green	1.50
TREES IN WINTER—A. S. Blakeslee and C. D. Jarvis	2.00
MANUAL OF THE TREES OF NORTH AMERICA (exclusive of Mexico)—Chas. Sprague Sargent	6.00
AMERICAN WOODS—Romeyn B. Hough, 14 Volumes, per Volume	7.50
HANDBOOK OF THE TREES OF THE NORTHERN U. S. AND CANADA, EAST OF THE ROCKY MOUNTAINS—Romeyn B. Hough	6.00
GETTING ACQUAINTED WITH THE TREES—J. Horace McFarland	1.75
PRINCIPAL SPECIES OF WOOD; THEIR CHARACTERISTIC PROPERTIES—Chas. H. Snow	3.50
HANDBOOK OF TIMBER PRESERVATION—Samuel M. Rowe	5.00
TREES OF NEW ENGLAND—L. L. Dame and Henry Brooks	1.50
TREES, SHRUBS AND VINES OF THE NORTHEASTERN UNITED STATES—H. E. Parkhurst	1.50
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THE IMPORTANT TIMBER TREES OF THE UNITED STATES—S. B. Elliott	2.50
FORESTRY IN NEW ENGLAND—Ralph C. Hawley and Austin F. Hawes	3.50
THE PRINCIPLES OF HANDLING WOODLANDS—Henry Solon Graves	1.50
SHADE TREES IN TOWNS AND CITIES—William Solotaroff	3.00
THE TREE GUIDE—By Julia Ellen Rogers	1.00
MANUAL FOR NORTHERN WOODSMEN—Austin Cary	2.12
FARM FORESTRY—Alfred Akerman	.57
THE THEORY AND PRACTICE OF WORKING PLANS (in forest organization)—A. B. Recknagel	2.10
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HANDBOOK FOR RANGERS AND WOODSMEN—By Jay L. B. Taylor	2.50
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THE ESSENTIALS OF AMERICAN TIMBER LAW—By J. P. Kinney	3.00
HANDBOOK OF CLEARING AND GRUBBING, METHODS AND COST—By Halbert P. Gillette	2.50
FRENCH FORESTS AND FORESTRY—By Theodore S. Woolsey, Jr.	2.50
MANUAL OF POISONOUS PLANTS—By L. H. Pammel	5.35
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EXERCISES IN FOREST MENSURATION—Winkenwerder and Clark	1.50
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THE FOREST RANGER AND OTHER VERSE—By John Guthrie	1.60

*** This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.**

THE FOREST POLICY OF FRANCE—ITS VINDICATION

(*Continued from Page 1385*)

advocate a wholesale transplanting of French policies or methods to the United States. Yet in many respects, what the French have done is strikingly suggestive of practical solutions of forest problems in the United States. Some of these will be discussed in greater detail in later articles. In considering them let us not forget, particularly in view of the reawakening to the importance of our own forests which the war has brought about, how the forest policy of France has vindicated itself in a crucial test of national strength.

NOTE:—THIS IS THE FIRST OF A SERIES OF ARTICLES BY LT.-COL. W. B. GREELEY ON FRENCH FORESTRY CONDITIONS. THE OTHERS ARE AS FOLLOWS: NOVEMBER, THE FOREST CODE AND THE REGIME FORESTIER. DECEMBER, THE CONTROL OF SAND DUNES AND MOUNTAIN TORRENTS. JANUARY, FORESTRY ON PRIVATE LANDS IN FRANCE.

THE LOONS AND GREBES

(*Continued from Page 1422*)

than the horned grebe, confined to western North America, is the eared grebe. It has the same yellowish tufts of feathers on the sides of the head but its neck is black instead of chestnut.

Another grebe of western United States is called the western grebe. It resembles the winter plumage of the horned grebe at all seasons of the year but it has a much longer and more slender neck. At one time the snowy white breast plumage of this bird was in great demand by milliners which resulted in the near extinction of this species, as well as the eared and even the horned grebes. The marshes and tule-bordered lakes of the West gave up thousands of these graceful birds to satisfy the dictates of fashion and for a time they almost disappeared. Now, however, they are protected, and, as one travels westward, he can gaze from the train windows and see them gliding over the surface of the reedy ponds and even catch glimpses of their floating nests or downy young.

TIMBER RESOURCES OF THE NORTHWEST

IF all the timber were cut into lumber and loaded on freight cars it would take 114,000,000 cars and 77,700,000 cars respectively to haul away the Douglas fir of Oregon and Washington, allowing the usual 30,000 feet of lumber to a car. Washington and Oregon contain one-third of all the standing timber in the United States. One-fourth of all standing timber in the country is Douglas fir and 80 per cent of the Douglas fir is in these two states.

The lumbering industry, including logging, sawmill operations and maufactured wood products is the largest single industry in Oregon and Washington and gives employment to nearly 60 per cent of the working population in the two states.

In Montana, a conservative government estimate places the standing timber at 65 billion feet, a large part in government forest reserves. At the present rate of cutting—300 million feet a year—it would take over 200 years to fell this enormous stand and as reforestation has already begun and methods of fighting forest fires are improving, there will be billions of feet of timber left in Montana at the end of the next hundred years.

DOUGLAS FIR AT ATLANTIC CITY

THE famous "board walk" at Atlantic City is being rebuilt of Douglas fir, replacing the planks of southern pine which have for two generations borne the weight of the gay habitues of the popular resort of the Atlantic seaboard, according to Secretary R. B. Allen, of the West Coast Lumbermen's Association. (*The Timberman*, June, 1919, page 109.)

FOREST SCHOOL NOTES

UNIVERSITY OF CALIFORNIA

AT the first regular meeting of the Forestry Club the following officers were unanimously chosen: president, George M. Gowan; vice-president, Landis J. Arnold; secretary, Willis M. Wagener; treasurer, Virgil Davis; sergeant-at-arms, Professor Emanuel Fritz.

Professor Mulford said a few words of greeting and welcome to old and new club members and reminded his hearers that forestry is "of age" as a science in America with the opening of this college year; the first instruction in the subject having been given twenty-one years ago.

"The very fact that the profession is of age," he said, "obligates all of us to strive for clearer thinking and more solid and adequate foundation work in research than ever before. People have a right to expect more of us and we must strive to measure up to those expectations." He predicted much better days ahead for foresters and forestry in general in spite of past and present discouragements and said he believed that the outlook for men going into forestry had never been better than at the present time.

Though only five years old and the youngest division in the College of Agriculture, the Forestry Division is now fourth in enrollment and but very little below Pomology which is next largest.

The club received from Hall and Ryerson two interesting mementos of their stay in France. One is the official badge of the French Forest Service today; the other, which is very rare, is the official badge worn by foresters during the reign of Napoleon.

Professor Bruce is at present on a field trip with Forest Examiner S. B. Show in connection with logging and mensuration studies in the Central Sierras.

UNIVERSITY OF IDAHO

DEAN F. G. MILLER, of the University School of Forestry at Moscow, Idaho, has just returned from Heybourne Park where he spent several days investigating timber conditions and forest cutting there. The trip was undertaken at the request of William J. Hall, State Commissioner of Public Works. A more extended reconnaissance is planned for next summer.

Heybourne Park was purchased by the state in 1909 from the Federal Government and comprises some 8,000 acres in addition to Chatcolet Lake. It was dedicated to the people of Idaho.

Because of its accessibility, its wooded hills and lake, Dean Miller believes that it will soon become the playground of the Northwest.

Other members of the party were: W. I. Bassett, district engineer of the State Highway Department; M. H. Wolff, forest supervisor of the Coeur d'Alene National Forest; C. L. Billings, lumberman of the United States forest service; Judge E. F. Conklin, superintendent of the park, and E. C. Mohr, in charge of logging operations.

The purpose of the trip was to decide on a future policy for cutting timber.

UNIVERSITY OF MAINE

C. W. L. Chapman, a 1914 graduate of the Forestry Department of the University of Maine, has been appointed an assistant in the forestry school at Orono. Mr. Chapman has had both practical experience in the field and in teaching, is very highly recommended for his work and has also been in war work.

The school has had more applications for entrance than ever before in the history of the University, and it looks as if it will have the largest entering class. Many who dropped out during the war period are coming back to finish their work, so the prospects for the coming college year are most encouraging.

NEW YORK STATE COLLEGE OF FORESTRY

THREE developments of great importance to the New York State College of Forestry at Syracuse University have been announced on the eve of the opening of the college year of 1919-20. They are the inauguration of a department of Forest Recreation; the establishment of the Roosevelt Wild Life Experiment Station; the beginning of a series of practical forest operations in the Summer Sophomore Camp at Cranberry Lake.

The three new departures are essentially different phases of forestry training, but are at the same time allied in some of their phases.

The department of Forest Recreation was determined upon by Dean Hugh P. Baker, of the College of Forestry, some months ago. Professor Henry R. Francis was selected as the head of the department, and to prepare himself for the work, and to secure data for the opening of the course he spent the summer months in a tour of the National Parks, traveling 8,000 miles by rail, 1,200 miles by automobile and 650 by horseback and on foot. In brief the new department will train men in the problems of proper utilization of forest areas for recreation, camping, hunting, fishing, summer camps for city people, tourists, and to help make the forests attractive in all phases which appeal to the vacationist.

School of Forestry
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Four Year Course, with opportunity to specialize in General Forestry, Logging Engineering, and Forest Grazing.

Forest Ranger Course of high school grade, covering three years of five months each.

Special Short Course covering twelve weeks designed for those who cannot take the time for the fuller courses.

Correspondence Course in Lumber and Its Uses. No tuition, and otherwise expenses are the lowest.

For Further Particulars Address

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Eight-weeks Summer Camp on large lumbering and milling operation in North Georgia. Field training in Surveying, Timber Estimating, Logging Engineering, Lumber Grading, Milling.

Special vocational courses for rehabilitated soldiers.

Exceptional opportunity to prepare for healthful, pleasant, lucrative employment in the open.

(*Special announcement sent upon request.*)

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AMERICAN PRIVATE SCHOOLS
A Guide Book for Parents

A Standard Annual of Reference. Describes critically and discriminately the Private Schools of all classifications.
Comparative Tables give the relative cost, size, age, special features, etc.
Introductory Chapters review interesting developments of the year in education—Modern Schools, War Changes in the Schools, Educational Reconstruction, What the Schools Are Doing, Recent Educational Literature, etc.
Our Educational Service Bureau will be glad to advise and write you intimately about any school or class of schools.
Fifth edition, 1919, revised and enlarged, 786 pages, $3.00. Circulars and sample pages.
PORTER E. SARGENT, 14 Beacon Street, Boston, Mass.

The establishment of the Roosevelt Wild Life Experiment Station is by authorization of the state legislature, and is the direct outcome of plans made in 1916 by Theodore Roosevelt himself. The functions of the station as specified by the new law are "to establish and conduct an experimental station in which there shall be maintained records of the results of the experiments and investigations and research work accomplished; also a library of works, publications, papers and data having to do with wild life together with means for practical illustration and demonstration, which library shall at all reasonable hours be open to the public." Other duties are to make investigations of the life, histories, propagation, management of fish, birds, game and food and fur-bearing animals and forest wild life. Quarters will be provided at the College of Forestry Experiment Station at Syracuse.

The work done the past summer at the Cranberry Lake Sophomore Camp as practical training in forestry has been developed along an entirely new line, one of great interest to the students, and of a real public value as well. In some respects it is allied to the new recreational forestry department, for the students were assigned the task of laying out trails toward different parts of the camp's 1,000 acre area, for visitors to use in getting to points of interest. These trails are two in number, as the first year's work and will be maintained properly inscribed with the class numerals of the Class of '21, as mementos of the summer work of this class. The trails will next year be continued into the distant depths of the forest, and eventually it is hoped to connect them with the state system of trails and highways.

This expansion in the field of the College of Forestry has been paralleled by the largest opening attendance in the history of the institution. The freshman class entering September 16 was the largest in the history of the College of Forestry, and was larger than the entire attendance in all classes during the year of 1918-19, depleted as was the college during that year by the war conditions.

Luis J. Reyes, of Manila, a Filipino Forester, has been sent to the New York State College of Forestry at Syracuse to take a college course in forestry.

Mr. Reyes comes to America as a special student sent by the Forestry Bureau of the Philippines, after six years service as assistant wood expert in that bureau. He is a graduate of the Forest School of the University of the Philippines and after graduation was made a member of the governmental bureau.

Of special importance is the fact that he brings with him 300 authentic samples of Philippine woods, comprising 150 species, giving the College of Forestry the most complete such collection in the country. He is to specialize in microscopic study of woods, in the course in wood technology, as the use of the high-power microscope is of utmost importance in final determination of Philippine lumber.

"The need of the microscope is shown," said Mr. Reyes, "in the case of Tangile and Red Lauan. Tangile is worth 200 pesos a thousand, and is valuable for airplane propellers as is mahogany. Lauan, however, worth only 150 pesos, resembles Tangile so closely that though entirely unfit for airplane propellers, the microscope is needed to tell the difference. That is why the scientist, and the technical forester is needed in the lumber industry in the Philippines."

FOREST SERVICE OFFERS PHOTOGRAPHIC EXHIBITS.

NEW photographic exhibits on "Forestry and Nature Study" and "Farm Woodlands" may now be borrowed from the Forest Service, United States Department of Agriculture, by schools and libraries. The "Forestry and Nature Study" exhibit is a pictorial story of how trees grow, and of the buds, leaves, flowers, and fruits, the typical forms of trees, the different kinds of forests, and the influences that affect their growth, and the enemies and friends of the forest. The "Farm Woodland" exhibit, which is especially adapted for use in agricultural and rural schools, shows different types of woodland, how the farmer can use the woodland and sell the product, and how trees make waste land profitable and help the farmer in other ways. The exhibits are made up in panel form, each panel consisting of 4 sepia enlargements.

Teachers who are interested in the forests in a more general way will find what they need in the original photograph exhibits of the Forest Service, which show forest conditions in the United States, how the forests are used, and how they may be preserved.

For classes in manual training and the like there are exhibits of commercially important woods of the United States with explanatory charts and tables. Schools that have a lantern, or can provide one, may borrow sets of lantern slides with prepared outlines for lectures on many topics connected with forestry. For instance, there are sets on forestry in the United States, and on nature study, botany, manual training, geography and agriculture in relation to forestry, and on street trees and wind-breaks. Recently a set has been made up on recreation in the national forests. Lists of subjects and other details may be secured on application to the Forest Service, Washington, District of Columbia.

BOUQUETS

"I take this opportunity to congratulate you on the very great interest you have developed in the magazine and the great increase in scope which has been evolved in recent years. It is one of the most welcome periodicals which comes to our house."

E. G. CUTLER.

"It is gratifying to see so much forestry in the August number of AMERICAN FORESTRY."

K. W. WOODWARD.

"I was very much gratified to have the August number of your most interesting magazine, and want to congratulate you on its many entertaining and attractive features."

NELSON C. BROWN.

"The Magazine is certainly fine."

MARY J. CHUTE.

"I deem it a great privilege to be a member of the American Forestry Association, and derive great pleasure and profit from the magazine as well as many helpful suggestions for my forestry work."

MRS. ADELAIDE M. GODDING.

"I have given AMERICAN FORESTRY my careful investigation and I consider it an excellent magazine and will do what I can to have it placed in our High School libraries."

MISS A. F. BROWN.

"I enjoy your magazine, AMERICAN FORESTRY, very much."

COL. CHAS. H. CUMMINGS.

"The magazine is a credit to the Association and yourself. It is the most effective agency for keeping the forestry movement before the people."

SOUTHERN PINE ASSOCIATION.

"AMERICAN FORESTRY is used by all our students, but particularly by the younger ones in their school work. All that you claim for it is true and even more."

HARRIET H. AMES.

"Though there are numberless demands for one's bit of income these unusual times, I feel that AMERICAN FORESTRY and the cause it represents are too good to pass by. The magazine is beautiful, interesting, instructive and altogether delightful."

F. H. BALLOU.

"I read your magazine with great enjoyment.

THOMAS F. TAYLOR.

"One of the several factors that help make AMERICAN FORESTRY an unusually attractive, as well as helpful magazine, is its freshness—the use of artistic illustrations, beautiful photographs, art work, and, too, the physical make-up of the magazine. The average professional magazine, or class magazine, is pretty drab and colorless. AMERICAN FORESTRY is by all odds the most attractive magazine of that type that I have run across, not only because its contents are interesting and informative, but also they are presented with freshness, vitality, life and beauty."

PROF. LEW SARETT.

DAVEY TREE SURGEONS

Estate of Mrs. A. M. Booth, Great Neck, Long Island, New York.

W. G. Woodger, Garden Superintendent, Mrs. A. M. Booth Estate

The tribute of W. G. Woodger to Davey Tree Surgery

Broad Lawns, Great Neck, Long Island, New York.

The Davey Tree Expert Co., Inc., Kent, Ohio.

Gentlemen: I felt it my duty to write you a few lines in praise of the work of your representative and men on several fine trees on the estate of Mrs. A. M. Booth, most especially the very fine work done on a grand willow tree, not quite two years ago.

My employer is most gratified with the work and thinks there is no equal to The Davey Tree Expert Company. The men are extremely keen on their work and know it thoroughly. I am very interested in their work and think them worthy of great praise.

Yours truly,
W. G. WOODGER,
Garden Superintendent.

Loss of this magnificent willow would have been irreparable. Note below how Davey methods have bound the branches together with rigid steel rods, and filled the cavities sectionally with concrete to allow for the swaying of the tree

The saving of priceless trees is a matter of first importance on every estate. Davey Tree Surgery is a fulfillment of the maximum expectations of those who love and value trees. A careful examination of your trees will be made by appointment.

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John Davey, Father of Tree Surgery

Every real Davey Tree Surgeon is in the employ of The Davey Tree Expert Co., Inc., and the public is cautioned against those falsely representing themselves

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITION wanted by technically trained Forester; college graduate, 37 years of age and married. Have had seven years' experience in the National Forests of Oregon, California, Washington and Alaska. Also some European training. At present employed on timber surveys as chief of party in the Forest Service. Desire to make a change and will be glad to consider position as Forester on private estate, or as city Forester. Will also consider position as Asst. Superintendent of State Park and Game Preserve in addition to that of Forester. Can furnish the best of references. Address Box 820, care American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

An Opening For One Hundred Foresters

The position is that of Division Firewarden; the territory is approximately one-third of the State of New Jersey; the work is general administration of all forest fire matters together with attendance at large fires, investigation of the causes of fires, supervision of the personnel of the local firewarden service, about one hundred men, and responsibility for the publicity and propaganda fire prevention work in the territory. The compensation is $1,200 to start, with every likelihood of increase shortly, the qualifications are that a man shall be a graduate of some reputable technical forestry school. The reason for requiring technical training is that advancement may be either in the forest fire work or in the technical forestry activities of the Department and in addition the incumbent is called on during the slacker season for forest fire work, to do technical and propaganda forestry work in his territory. Apply Box 830, care American Forestry, Washington, D. C.

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of reference Address Box 600, Care American Forestry Magazine, Washington, D. C. (1-3)

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, Care American Forestry Magazine, Washington, D. C. (1-3)

Man to be discharged from the Army September 30th desires position in forestry work, with lumber or railroad company or assisting in investigations of utilization of wood products. Would accept position in other work. Is married man, graduate of Michigan Agricultural College, 1913. Has had experience in orchard work, clearing land, improvement cuttings, planting and care of nursery, pine and hardwood transplants, orchards and larger trees, grading and construction of gravel roads, and other improvement work. Has executive ability and gets good results from men. Please address Box 860, care of American Forestry Magazine, Washington, D. C. (9-11)

FORESTER wanted as Division Firewarden in New Jersey. Must have professional training and some experience. Salary $100 to $120. Eligible for promotion to Assistant Forester. Civil Service examination can be taken after provisional appointment or by mail. Box 810, care American Forestry Magazine, Washington, D. C.

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 810, care American Forestry, Washington, D. C.

WANTED—Position with Lumber Company or Private Concern by technically trained Forester with five years practical experience. Box 820, care American Forestry.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

PRESIDENT, CANADIAN SOCIETY OF FOREST ENGINEERS

THE Hon. Jules Allard, for ten years Minister of Lands and Forests of Quebec, has resigned. Mr. Allard has been Minister longer than any of his predecessors and during his term of office more progress has been made than in the whole previous history of the Department. The revenues from Government Lands have been materially increased, one of the most efficient fire protective systems on the continent put in operation, buying of lands by timber speculators has almost wholly been eliminated, improvements have been made in cutting regulations and much important forestry legislation been enacted. Mr. Allard is a man of broad views and deep interest in the progress and welfare of his country and his Province and everyone is sorry to have him relinquish his office. He remains, however, a member of the Legislative Council and will continue to use his influence and interest for the welfare and improvement of the Crown Forests.

Mr. Allard has been succeeded by the Hon. Mr. Mercier, for some time Minister of Colonization, which Department he has successfully conducted. He brings to his new office a wide knowledge of the Province from actual experience as he has traveled all over it and has seen the forest at first hand on many a hunting and canoeing trip. He is a man of energy and broad views and will take up and worthily carry on the work started by the Hon. Mr. Turgeon and carried on by the Hon. Jules Allard so successfully.

Mr. Piche, the Chief Forester, has had several parties in the woods this summer making studies of the quantities of timber in various districts, rates of growth, conditions on cut-over areas, prevalence of various insect pests and fungous diseases and so forth. Mr. Piche has done much valuable work since he became Chief Forester and it is hoped that he will soon let his confreres have the benefit of his researches through the medium of bulletins from his Department.

Mr. Clyde Leavitt, Forester of the Commission of Conservation, underwent a serious operation early in the summer but is now back at his desk again much improved in health.

The researches of the Commission of Conservation in cooperation with the Laurentide, Abittibi and Riordan Pulp and Paper Companies have been making good progress during the summer. New sample plots and subplots have been laid out, those on the Laurentide Company's Limits now totaling 13 acres. Here a substantial camp has been built with facilities for all sorts of research work. Studies of rates of growth, meteorological conditions, rates of evaporation, insects and fungous diseases have been carried on. It has been found, for instance, that the daily rate of growth of trees is proportional to the temperature. The borer which is causing the death of the white birch has been thoroughly studied. Areas which have been burnt are being studied under different conditions to see which trees seed in first on them and why. Different methods of cutting are being tried on a small scale.

Contracts have also been made with the Logging Departments of the Laurentide, Abittibi and Bathurst Lumber Companies to cut sample areas of about 200 acres according to forestry methods, careful records being kept of the conditions before and after cutting, the cost of logging, brush burning and utilization of smaller sizes of wood and so forth.

Although there have been many difficulties to be overcome, chiefly the late start at the beginning of the season, the seaplane patrol of the St. Maurice Forest Protective Association has been carried on with a fair measure of success and the practicability of the work demonstrated beyond any doubt. The planes have flown all over the territory of 16,000 square miles without any difficulty whatever. Fires have been discovered, explorers for one of the constituent companies have been taken over the territory they wished to see, reports of the burnt-over and timber conditions have been made, etc. The planes have proved to be too large for gasoline economy as they use 30 gallons per hour. The ideal installation would be two smaller machines for patrol purposes and a large machine to carry to the scene of a fire a portable gasoline pump and hose, tools and three men. The experiment will probably be continued next season under the auspices of the newly created Air Board. The rest of the season will be spent in photographic work for making maps.

The fire season has been the worst in Eastern Canada for several years, owing to long continued dry weather. Few fires were reported from New Brunswick, Quebec suffered a little more than in the previous year and the losses in Ontario were very large. The problem of settlers starting clearing fires in Northern Ontario will

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The "K" is made of Bessemer steel, is light, portable, practically indestructible, and is guaranteed against breakage.

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Location.—Within the Kootenai and Pend Oreille National Forests, Montana and Idaho, in Sec. 19, T. 31 N., R. 34 W., M. P. M., and approximate unsurveyed Secs. 24, 25, 26, 35 and 36, T. 31 N., R. 35 W., M. P. M., Secs. 31, 33, and 34, T. 59 N., R. 3 E.; Secs. 3, 4, 5, 6, 8, 9, 10, 15, 16 and 17 T. 58 N., R. 3 E., B. M., Callahan Creek watershed.

Stumpage Prices.—Lowest rates considered, $3.50 per M for green white pine and $1.00 per M for dead white pine, $1.00 per M for spruce, and 50c per M for other species; and special rates for cedar poles of various dimensions, piling, shingle bolts, cedar post material and cordwood.
The removal of larch and Douglas fir saw timber, cedar posts, shingle bolts, and cordwood will be optional with the purchaser.

Deposit.—With bid, $5,000.00 to apply on purchase price if bid is accepted or refunded if rejected.

Final Date For Bids.—Sealed bids will be received by the District Forester, Missoula, Montana, up to and including December 24, 1919. The right to reject any and all bids is reserved. Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Missoula, Montana, or the Forest Supervisor, Libby, Montana.

have to be met promptly and vigorously. The Prairie Provinces also suffered severely.

Dr. C. D. Howe has been appointed Acting Dean of the Forestry Department of the University of Toronto to take the place left vacant by the resignation of Dr. Fernow.

As Dr. Fernow was the Father of Forestry in the United States so he has been in Canada, and it is with the deepest regret that we see him giving up his active work among us. We wish him all sorts of good things in the retirement which he has chosen and shall ever remember the inspiration he has been to us and the great things he has done for forestry.

A party which has been making a survey of the areas in New Brunswick affected by the spruce bud worm, reports that practically all the balsam in that Province is affected and is dying. The spruce is only slightly attacked.

Mr. A. C. Volckmar, Forester of the Canada Paper Company, is making a reconnaissance of about two hundred square miles on the St. Ann River in Quebec.

It is reported that an aeroplane exploration undertaken by American interests in Labrador has proved a great success and that large areas of valuable timber were discovered. Confirmation of these reports and the size and amount of the timber will be awaited with interest as all previous explorers report timber only in the river valleys and that of small size.

A new saw for cutting down trees and cutting them up into logs is described in the Scientific American. It is electrically operated, the current being supplied by a portable dynamo driven by a gasoline engine. The saw is mounted on wheels and on a universal joint so that it can be set at any height or angle. Trees can be cut very rapidly and close to the ground. The set of the teeth is also novel and it is claimed that it operates very rapidly. In view of the increasing cost and decreasing efficiency of woods labor this should be thoroughly tried out and might prove of great advantage.

The Wayagamac Pulp and Paper Company have purchased a number of small caterpillar tractors and will try them in their logging operations this coming winter.

The Association of the Northeastern Foresters has decided to hold its next annual summer meeting at Grand'Mere, Quebec, as the guests of the Forestry Division of the Laurentide Company, Ltd. They will also be the guests of the Commission of Conservation at its Lac Edward Experimental Station.

ARBORISTS MEET

THE American Academy of Arborists, which suspended its meetings during the period of the war has renewed its activities, and is again prepared to disseminate the much needed scientific information on the planting and growing of trees, especially at this period of reconstruction.

The Academy held its first meeting in 1915, choosing for its object the advancement of arboricultural and landscape forestry and the maintenance of the highest professional standard among its members. Its membership is now extensively distributed throughout the United States, and at its last meeting it was voted to refer important inquiries on all tree matters to the nearest regional member.

After many interesting discussions on tree problems, the following resolutions were also unanimously adopted:

"I. Resolved, That the American Academy of Arborists endorses and strongly urges the planting of trees as memorials commemorating the heroes of the World War, but strongly advises the careful selection of species native and suitable for the location. In discussing this resolution the prevailing members favored the sturdy, long-lived varieties, characteristic of American ideals, and particularly discouraged the quick growing and weak varieties.

"II. Resolved, That the American Academy of Arborists endorses the name of the Federal Horticultural Board to prevent the further importation of plant pests but urges the representation on the Board of practical arborists and foresters.

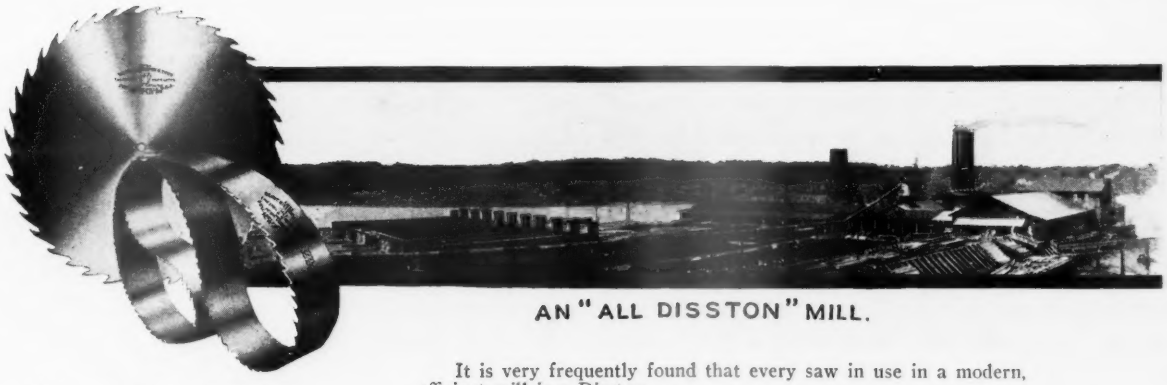
"III. Resolved, That the American Academy of Arborists endorses the work of the American Joint Committee of Horticultural Nomenclature in standardizing scientific and common plant names for use of arborists and horticulturists and obligates itself to the use of these standardized names as published by said Committee."

It was decided to hold the next meeting in Washington on the second Saturday of January, 1920, and it was also decided to have some of the papers presented before the Academy at this meeting given out for publication.

GRAYS HARBOR COUNTY WILL CUT OUT IN 16 YEARS

"APPROXIMATELY 1,000,000,000 feet of lumber was the output of the Grays Harbor County mills during the year of 1918, according to figures compiled in the office of the county assessor. The assessment rolls show that 414,295 acres of timberland remain to be logged in Grays Harbor County. The record last year was 26,364 acres cut over." (*American Lumberman*, August 16, 1919, page 70.)

This means only 16 years' cut remaining in one of the biggest timber producing districts of the Pacific Northwest.



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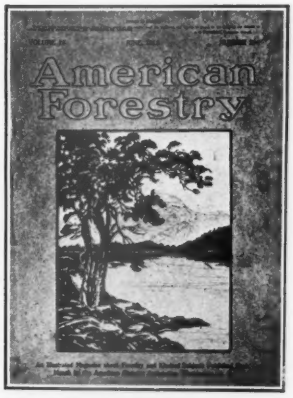

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PLANT MEMORIAL TREES

STATE NEWS

CALIFORNIA

"THIS year for the first time the state of California is enabled to benefit by the terms of the Weeks Law agreement by reason of the appropriation made by the last legislature for the prevention and suppression of forest fires," says M. B. Pratt, deputy state forester. "Through the use of the federal and state funds, approximately three million acres of brush and timber land lying in the foothills of the Sierra Nevada Mountains outside the National Forests are receiving systematic protection through the employment of four experienced patrolmen.

"These patrolmen cooperate with the federal forest service and rural fire-fighting companies organized through farm centers by the county farm agents. They are provided with Fords and fire-fighting equipment for twenty men by the state which also authorizes them to incur fire-fighting expenses to the extent of their monthly letters of authorization. These salaries are paid by the federal government through the office of the district forester at San Francisco.

"The region covered by the Weeks Law patrolmen is one of great fire hazard due to the amount of inflammable material, intense summer heat, heavy winds and the large number of campers and hunters. Precipitation in California during March, April, May and June of this year was, according to Weather Bureau records, 27 per cent, 53 per cent, 74 per cent and 97 per cent respectively, below normal. Rain cannot be expected until the last of September which makes a long fire season and strenuous work for those engaged in fire protection.

"Since being appointed in July, the Weeks Law patrolmen have been almost constantly engaged in fighting fires some of which would have swept the Sierra foothills had they not been promptly suppressed. The region which they cover is patrolled daily by airplanes from Mather Field near Sacramento, and is under the eyes of federal lookout men in the adjoining National Forests as well. As a result, fires are promptly apprehended. The very bad fire conditions have made some of them difficult to control, and several have covered five thousand acres or more destroying young timber, watershed cover and ranch property. Reports to September 1st give a total of 30,000 acres of brush and timber lands burned over outside the national forests.

"The situation is not as bad as in Idaho and Montana since the country is well settled for the most part, and there are roads and trails from which to back-fire in advance of the main fire. The loss has been serious enough, however, to make people realize that the fire problem in California is a long way from being solved. The few trained men that are on the job in the Sierra foothill country have demonstrated to the local residents what can be accomplished by organized effort, and the way is being paved for better cooperation and a more efficient organization next year."

CANADA

A. V. S. Pulling, who graduated from the New York State College of Forestry, at Syracuse, New York, in 1915, has been secured by the University of New Brunswick at Frederickton, New Brunswick, for the position in charge of the Department of Forestry. At the outbreak of the war Mr. Pulling enlisted in the 504th Engineers, winning a sergeancy, and being sent overseas with his organization.

ILLINOIS

STATE Forester R. B. Miller has had an interesting trip with Ransom H. Kennicott, Forester for the Cook County Forest Preserves, through the preserves, traveling by auto for an entire day without covering the entire chain of parks belonging to Cook County. Mr. Kennicott is confronted by the question of recreation and along this line is building roads, dams and drinking fountains and driving wells to secure drinking water for the campers and vacationists who are constantly seeking these wooded areas for health and enjoyment. On one park, the Deer Creek, he has two or three Boy Scout camps under competent direction and a Fresh Air camp, for Chicago children. The entire chain comprises 12,353 acres of forest and woodlands and on some of these he plans to maintain forest conditions and raise timber. On the Desplaines river he has also started a forest nursery of considerable size, in charge of "Bill" Johnson, of Syracuse University, who has surmounted many difficulties in the raising of seedlings. It takes a formidable force of rangers, guards, road builders, and others to look after the comfort of the public, as well as several district foresters, and Mr. Kennicott is happy in looking after all of the various projects and looking out for the comfort of his many guests.

About six miles east of Polo, Illinois, on the east side of Pine Creek, a tributary of the Rock River, in Ogle County, Illinois, is a unique white pine stand, the origin of which is unknown. Here is a fine tract of white pine resembling the finest stands in Pennsylvania or Connecticut, occupying about 150 acres. The diameter of the trees varies from 10 to 24 inches and the height is from 75 to 80 feet. According to Wesley Bradfield, who wrote a short report on this tract some years ago, the number of trees in the two groves is 1,017 and their total volume is about 245,000 feet. According to H. DeForest, a graduate of the Yale Forest School now making a report on the flora of Ogle County, the grove is unique in that the succession is from oak to white pine rather than from white pine to oak, the ordinary succession. There is a strong local sentiment in favor of making "The Pines" a forest reserve which would be a very good way of preserving a beautiful and rare tract of native timber, one of the few in Illinois. The stream, Pine Creek, has been stocked with bass and down near the stream there is an ideal camping site. A map of the site will be found on the Dixon Quadrangle of the Illinois Geological Survey.

Governor Lowden, of Illinois, has been an enthusiast for several years in forest and ornamental planting and at his farm, "Sinnissippi," three miles from Oregon, Illinois, can be found white pine and Scotch pine plantations fifteen years of age down to recent planting, all doing remarkably well on sandy soil. Many species of hardwood trees are also growing successfully on this farm which will well repay a visit.

An informal meeting of much importance was recently held at the Quadrangle Club, in Chicago. Those present were Dr. John M. Coulter and Dr. Cowles, of Chicago University; Dr. Shepherdson, Director of Registration and Education, from Springfield, Illinois; Dr. Forbes, Chief of the State Natural History Survey Division and State Forester R. B. Miller. Among the things to be included in the work of the first year it was decided that a forest survey of at least one county was necessary, in cooperation with the soil survey and topographic survey; an investigation should be conducted showing the profit and loss from grazing in the ordinary wood lot; that demonstration forests similar to those in Ohio be established on a cooperative basis with farmers; that certain questions vital to a forest policy for the state be carefully looked up, such as state forests, state nurseries, fire protection plans and forest taxation; that the estimating of timber and the bringing together of buyer and seller was a legitimate work for the state forester to engage in and that so far as possible he should cooperate with the county advisers, through personal conferences and lectures, so as to bring forestry information to the people; in addition carry on publicity work through the press and by public lectures wherever possible. Co-

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BEMIDJI, MINN.
By L. F. Johnson: Lieut. Ralph D. Gracie.

OMAHA, NEB.
By United States Army Balloon School: James Owen Curtis, Walter L. Sievers, Bertie L. Noah, Robert D. R. Weigel, Carl Frick, Anton Nepper.

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PLANT MEMORIAL TREES FOR OUR HEROIC DEAD

operation with the Forest Service in their national program was agreed upon as of vital importance just at this time, when a forestry policy was being formulated.

The Ayer and Lord Wood Preserving plant at Carbondale, Illinois, is one of the largest in the country and operates eight treating cylinders for treating railroad ties, zinc chloride being used at present. The plant employs as high as 285 men and treats about 15,000 ties per day. The plant for making and treating wood blocks has been temporarily shut down owing to the high price of longleaf pine. It is stated that only about 1% of the ties treated come from Illinois. Almost any species can be treated at present prices, beech being one of the new arrivals within the last few years. The Illinois Central has a treating plant at Marion, Illinois.

MASSACHUSETTS

ONE of the five state forests that have been established during the past four years in Massachusetts is situated in Southern Berkshire County, and is known as the Arthur Wharton Swann State Forest. It was a gift to the Commonwealth by Mrs. Susan R. S. Swann in memory of her husband. On this forest are many acres of chestnut growth in a dead or dying condition, and at its last session the legislature appropriated ten thousand dollars for the use of the State Forester in cutting and marketing this growth before it becomes completely valueless. It is probable that a mill will be placed on the reservation so that such sawing as may be necessary can be done without too great a haul.

After nearly a year's service in France as Y. M. C. A. secretary, Mr. Frank L. Haynes, Engineer for the State Forest Commission, has returned to this country and resumed his duties with the Massachusetts state forest department. While in France, Mr. Haynes was stationed at Aix-les-Bains, Chamonix, Paris, and St. Quay, which places were used as leave areas for the soldiers of the A. E. F.

Emulating the example of the Federal Government, Massachusetts is throwing open its state forests for the use of Massachusetts citizens for recreational purposes. The shores of the lakes and ponds within the borders of these forest reservations have been surveyed into lots of one hundred feet front on the water and two hundred feet deep. The camp sites have been divided into two classes—temporary and permanent. For the use of a temporary site a fee of one dollar per week is charged, and for the use of a permanent site the permittee pays a rental of ten dollars per year. Many of those who have selected camp sites contemplate the erection of substantial cottages. The lakes on these reservations have been stocked with bass and other varieties of fish by the Massachusetts Fish and Game Commission, so that campers are assured of good fishing during the open season.

The auto-truck sprayers designed by the Massachusetts forestry department and used in connection with the suppression of the gypsy moth have proved to be very important factors in protecting the roadside trees from the depredations of these pests. They have taken the place of the horse-drawn sprayer, and by their use a much greater amount of territory is covered than formerly, with a reduced cost.

NEW HAMPSHIRE

TRAMPERS in the White Mountain National Forest will find ready for them next summer the first north-and-south trail extending through the area of land held by the Federal Government. The new trail will be made a reality by the construction of a link from Bartlett, New Hampshire, over Cave Mountain and Mount Parker to connect with the Davis Path on Mount Resolution. The link, which is to be constructed by the Forest Service of the United States Department of Agriculture, and the paths with which it will connect, will extend for approximately forty miles, from Wonalancet, at the extreme southerly end of the White Mountain group, to Appalachia, at the north of the Presidential Range.

Trampers can profitably spend a week in traversing the new route, according to Forest Service officials. It will pass over most of the Presidential Range, and will disclose some of the most beautiful scenery of this vacation land. Following is a description of the new route:

Old Mast road between Wonalancet and Passaconaway; Douglas Brook trail from Passaconaway to Bartlett; new link over Cave Mountain and Mount Parker to Davis path on Mount Resolution; Davis path to Crawford Bridle path, Gulfside trail, Valley Way to Appalachia.

The route is well supplied with shelter between Appalachia and Bartlett, while the hotel accommodations will be found at Passaconaway.

What to name the new route is being debated by the Forest Service men. One suggestion is that it be called Agiocochook, which is the Indian name for Mount Washington. This name is open to objection, officials say, because of its length and difficulty. There may be a compromise. In the meantime the office of the Forest Supervisor at Gorham, New Hampshire, invites suggestions.

The Forest Service also expects to have in operation early next summer the two public camping grounds that are being installed on Government-owned land. One is at the Dolly Copp farm on the State highway about five miles south of Gorham. The other is on the Profile road about seven miles from Twin Mountain, and about the same distance from the Old Man of the Mountains. The camp grounds are located in sheltered valleys and are well supplied with piped spring water and sanitary conveniences. Each is to have a big stone fireplace for public use. Trampers, campers, and automobile parties will have free use of the grounds and conveniences, and they are invited to make use of them, subject only to the usual etiquette and protective restrictions that govern in the forests. It will be necessary, of course, for all visitors to supply their own tents.

Two acres of white pine, near Keene, New Hampshire, sold three or four years ago, before the war prices, brought $2,000 on the stump. The total stand was 254 cords, which equals 170,000 board feet, or an average of 85,000 feet per acre. Much of it was 80 to 85 years old, so the growth was about 1,000 feet per acre per annum. Stump examinations showed a rapid growth the first 35 years.

MICHIGAN

TO date, nearly 8,000 acres have been planted with young trees on the logged over lands included within the Michigan State Forests. Some of the plantations are more than fifteen years old, but more than fifty per cent have been planted within the last five years. White pine has been planted more than any one other species, but Norway pine, Jack pine and Scotch pine are also planted largely. Austrian pine and European larch have been planted in an experimental way, but due to their inability to resist frost and drought have not succeeded well, and they are no longer used. The western species, lodgepole pine and western yellow pine were planted some years ago and gave promise of being splendidly adapted to some localities of this region, but unfortunately they were seriously injured by a fungus (*Peridermium sp.*) and all those which were planted were destroyed and no more have been set. Some few acres have been set to Norway spruce, but so far, due to their slow growth on the sand lands, they have not proven very encouraging to further planting.

Hardwoods have also been planted, poplars, oaks, walnut, black locust, etc., but none have succeeded in a satisfactory manner.

It is interesting thus to note that after fifteen years of experimentation, the conclusion is reached by the Public Domain Commissioner that it is those trees which are native to the region that are proving the most successful for reforestation. It is true that the exotic, Scotch pine, which is planted extensively in the European forests, appears to be perfectly hardy here, more so indeed than either white or Norway pine, but yet very good evidence indicates that it will not produce better lumber, if as good, as does the native jack pine.

All the trees planted are raised in the nursery located within the Higgins Lake Forest. The nursery has capacity to produce sufficient seedlings to plant, with stock averaging two years old, 8,000 acres

per year. The loss of seedlings in the nursery from all causes, including the white grub, grass-hoppers, damping-off, heaving, frost, and drought is less than one per cent yearly.

In the plantations, however, such excellent results are not obtained. Examinations of the plantations indicate that of the white pine two and three year old seedlings planted, about sixty per cent survive. Jack pine does better, although it is planted on the poorer soils and is but one year old when set, for it is found that fully sixty-five per cent of the tiny trees survive. Scotch pine is nearly as hardy as the jack pine, but Norway pine, apparently due principally to frost killing, shows but barely fifty per cent survivals.

These mortality figures are not discouraging to the Public Domain Commission. Each year it learns more about the types of soil and the requirement of the seedlings, higher percentages of survivals are obtained. Indeed, of the two million seedlings which were planted this spring, despite the severe droughts and frosts of this summer, fully eighty-five per cent have survived, and it is expected that seventy-five per cent of these will be firmly established in 1925. Since the commission plants from 1,500 to 2,000 trees per acre, despite the losses, good stands will be obtained.

NEW JERSEY

DURING the past summer State Forester Alfred Gaskill, of the New Jersey Department of Conservation and Development, published a leaflet, which was widely announced through the press, making known the desirability and many advantages of the State forests and parks for outdoor recreation, and extending an invitation to the public to use them in this way.

This policy has met with such success, as evidenced by the numerous inquiries and applications for camp sites, that the Department's proposal to create a forty thousand acre State Forest Park along the Kittatinny Mountain in Sussex county seems assured of public approval.

New Jersey is most centrally situated with respect to population, over ten million people living within a radius of sixty miles of the capitol at Trenton.

An enormous increase in applications for camp sites must be expected as the State's invitation receives wider consideration among so many people, who seek recreation within a convenient distance from their homes.

The forest extending along the Kittatinny Mountain is a most desirable one for the expansion of State holdings, as it is well suited for recreation purposes as well as the practice of forestry. The seven thousand acres already embodied in the Stokes State Forest afford an unexcelled vacation ground for lovers of outdoor life.

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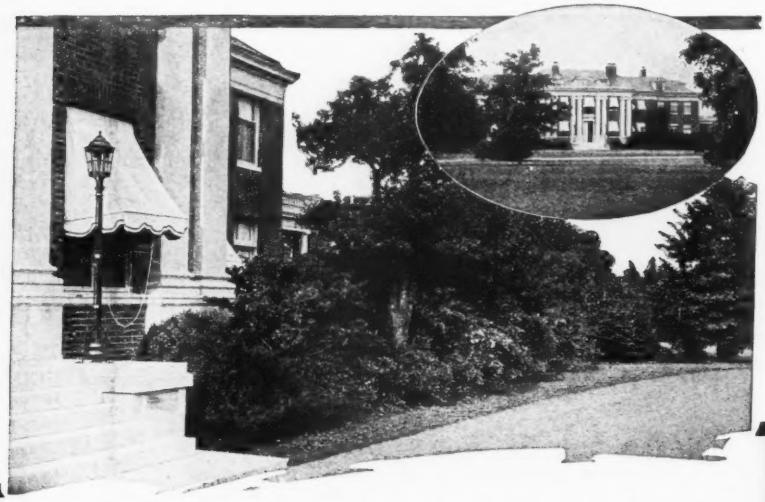

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Attractive camp sites, beautiful scenery, pure mountain air and spring water, trout fishing in season, are some of the attractions offered free to the public.

Nearby are the well-known mountain lake resorts—Culvers' Lake, Lake Owassa and Swartswood Lake, where fishing, boating and bathing may be had. This region is easily accessible by motor over good roads, and by railroad so that it may be reached in a little over three hours from Jersey City or Newark.

The Department is planning to enlarge this property to include forty thousand acres and create a great State Forest Park extending for thirty-five miles along the mountain from Delaware Water Gap to the New York State line.

This area will afford exceptional opportunities for the practice and demonstration of forestry management and protection, and at the same time will doubtless prove to be one of the most popular "public playgrounds" in the east.

NEW YORK

LUMBER and forestry interests in New York State are looking forward with interest to the second week of November.

Tuesday, November 11, has been definitely set as the date for the holding of the forestry conference at which Colonel Henry S. Graves, chief forester of the United States Forest Service, will discuss at Syracuse with all interested organizations his proposed national forest policy. This is the date of the meeting of the New York Forestry Association, and many manufacturers, retailers and dealers in lumber, foresters, and others interested in conservation have accepted invitations to attend and to hear Colonel Graves explain his proposed program.

Colonel Graves had originally agreed to hold a conference with the Empire State Forest Products Association, but the forestry association got the consent of the manufacturers to the present plan so that a more general discussion might be possible.

The Empire State Forest Products Association will hold its annual convention at Albany, November 13; the American Pulp and Paper Manufacturers' Association will hold a convention in New York City the latter part of that week. Thus many of those interested will travel from Syracuse to New York City by way of Albany to participate in the three conferences.

William Shemin, a graduate of the New York State Ranger School, at Wanakena, formerly working under a College of Forestry graduate, R. E. Waldenberger, city forester of Bayonne, New Jersey, followed his chief into the service and was wounded at Vesle, when in Company G, 47th regular infantry. He has now returned to his old chief, who has taken him to Niagara where Waldenberger is superintendent of the state reservation at Niagara Falls, New York.

"The Dessert Berry of the Nation"

The Erskine Park Everbearing Red Raspberry

The Erskine Park Everbearing Red Raspberry is a seedling from the old reliable Cuthbert, discovered on the Westinghouse Estate (Erskine Park) at Lee, Mass., by Mr. Edward Norman. This magnificent estate is in the midst of the beautiful Berkshire Hills, with a temperature in winter of 30 or 40 degrees below zero, so that the hardiness of this berry is unquestioned. The estate is surrounded by the summer homes of many wealthy people, and much to the surprise of his neighbor gardeners and not without a deal of personal satisfaction, Mr. Norman furnished large, luscious raspberries throughout the fall for various dinner parties.

These berries are commented on by all who have seen and tasted them as the most delicious and best raspberry they have ever eaten. Mr. Baker of Hoosick Falls, N. Y., writes us as follows, regarding this remarkable berry:

"In the season of 1916, Mr. George M. Darrow of the United States Department of Agriculture was traveling from the Atlantic to the Pacific, visiting fruit growers to obtain information on berries for bulletins published by the Department of Agriculture. Mr. Darrow had visited this estate before, and was most favorably impressed that this berry was far ahead of the St. Regis and Renere, and when it became known it would replace these varieties. The plant is by far the strongest growing raspberry I have ever seen. It branches like a tree, and it also has the largest and most roots of any variety with which I am acquainted. It is perfectly hardy and the berries are very large."

Of this berry we cannot say too much in praise, and we predict that once known, it will be a standard for planting in every garden and considered a necessity.

The Renere and St. Regis have been the standard up to the present time. In the Erskine Park we have a berry that far surpasses either of these; a raspberry that is a delight to eat, each berry being of largest size, with its delicious melting flesh, full of rich creamy juice, highly flavored and sweet as honey.

Conceive the joy and satisfaction of having such berries on your table all through the autumn, the source of wonder to your neighbors, that you can pick the finest raspberries until the snow flies. On November the 20th we cut a large branch of the Erskine Park with **blossoms, green berries** and **ripe fruit** upon it.

We have not as yet been able to propagate any large quantity of this magnificent berry, but what we have are the finest **Bearing Two-Year Old Plants,** heavily rooted and branched that will bring a full measure of pleasure and satisfaction to the planter.

Strong Field Grown Bearing Plants, per six, $3; per twelve, $5; per fifty, $15

One dozen plants set this fall will produce more fruit than two dozen plants set next spring. Plant this fall.

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NORTH CAROLINA

THE North Carolina Forestry Association has adopted the following fourteen points in forestry and asks the support of the people of the state in securing and enforcing them:

1. The scientific classification of forest and cut-over lands as those chiefly suitable for grazing and forestry.
2. Increased ownership of non-agricultural forest lands by federal, state and municipal governments.
3. Regulation of cutting on non-agricultural land in order to maintain a productive and profitable crop, and for the protection of our streams.
4. Growing a crop of timber on agricultural land not yet needed for a more profitable crop.
5. Prevention of all unnecessary waste in cutting and marketing timber.
6. Protection from fire of all young growth as well as merchantable timber.
7. State investigations looking to the rehabilitation of our naval stores industry.
8. Practical control of serious insect pests and fungus diseases of forest and shade trees.
9. Protection of young and growing forests from livestock through proper control.
10. Effective public control of water powers as a natural resource belonging to all the people.
11. Development and management of Mitchell state park for the benefit of the people of North Carolina.
12. Maintaining and increasing the beauty of our highways by proper utilization of trees and shrubs.
13. Effective protection of birds and game both for their economic and aesthetic values.
14. Training of the young to know and appreciate the value of trees, forests and wild life.

OREGON

IN view of the recent destructive fires in the northwest forests, the Pacific Logging Congress has sent to all loggers in this vast territory a set of fire rules which are comprehensive and public-spirited. Among other rules they advise shutting down the mills during dangerous weather rather than risk a disastrous fire, not leaving a fire even after it is under control until it is thoroughly extinguished, giving fire fighting precedence over everything, using all vigor and resources, and maintaining closest cooperation with fire wardens and other government officials. Many rules cover technical matters and the subject has evidently been given very careful attention.

TEXAS

ALFRED MacDONALD of Newton, Massachusetts, has recently been appointed City Forester in Dallas, Texas. Mr. MacDonald was formerly Field Secretary of the Massachusetts Forestry Association and later spent two years in the Graduate School of Forestry in Harvard University studying problems concerning city forestry.

The city of Dallas is planning an aggressive Memorial Tree planting campaign for this fall and present indications are that several hundred such trees will be set out by the Forestry Department. The Boy

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Scouts have already been enlisted to assist in the work of the Forestry Department in locating dead trees and suppressing noxious insects.

Most of the trees heretofore planted in Dallas have been native species and Forester MacDonald is planning to try, experimentally, trees of European and Asiatic origin, such as Norway Maple, Oriental Plane and Gingko, which have proved so successful in Eastern cities.

VERMONT

H. E. GRUPE, who went overseas with the 10th Engineers, was detached and put on special duty in Paris in criminal investigation, work entirely distinct from military investigation. He graduated from New York State College of Forestry in 1917, and has been engaged by the State Forestry Department of Vermont, being placed in charge of a district of the state forest.

WISCONSIN

A TEN-LESSON correspondence course in the kiln drying of lumber is offered for five dollars by the Extension Division of the University of Wisconsin in co-operation with the Forest Products Laboratory. The lessons are written in simple language and explain how lumber may be kiln dried for particular purposes with results which are superior to those produced by air seasoning.

A million-pound testing machine is being built for the Forest Products Laboratory at Madison for use in an investigation of the strength properties of large structural timbers.

Sixty-five members of the Technical Association of the Pulp and Paper Industry visited the Forest Products Laboratory on September 26 and spent the day inspecting the various departments. The visitors were particularly interested in the facilities of the laboratory for studying the control of mold in pulp wood.

SPECIAL OFFER TO MEMBERS ONLY

One of the following described books will be presented free of charge to any member of the American Forestry Association who secures ONE NEW subscribing member:

No. 1—Field Book of American Trees and Shrubs, 465 pages, 275 illustrations of trees, leaves, blossoms, fruits, seeds, area of growth, etc.

No. 2—Field Book of Wild Birds and Their Music, 262 pages, 38 colored and 15 other full-page illustrations.

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Subscription price without membership, three dollars per year; single copies, twenty-five cents.

FOREST FIRE PERIL ENDS

REPORTS and estimates from representatives of the Forest Service, United States Department of Agriculture, indicate that the period of the greatest forest fire peril that has ever confronted the Forest Service has been brought to an end by heavy rains and snows in Montana and northern Idaho. Until this sorely needed assistance from nature arrived the wooded areas of the district were so dry that fires gained terrific headway with astonishing rapidity.

A surprising number of electric storms occurred over these tinder-dry regions, unaccompanied by sufficient rain to check the flames which were started by lightning. More than half of the fires in the regions, reports show, were begun by such electrical discharges.

To meet this peril in Montana and northern Idaho, a maximum of 4,500 extra men were employed in addition to the regular forces in the field. By reason of what was probably better organization than has ever been effected heretofore, the fire fighters were able to keep the flames very largely away from the more valuable timber. While no definite figures are yet available, it is estimated that the burned area totals approximately one million acres. Much of this, however, was land which had been burned over at some previous time. What is known as a blow-up—a wind of great velocity—occurred during the season, and added greatly to the labor of the fire fighters. For a time it was feared that the destruction wrought might be as great as that in 1910.

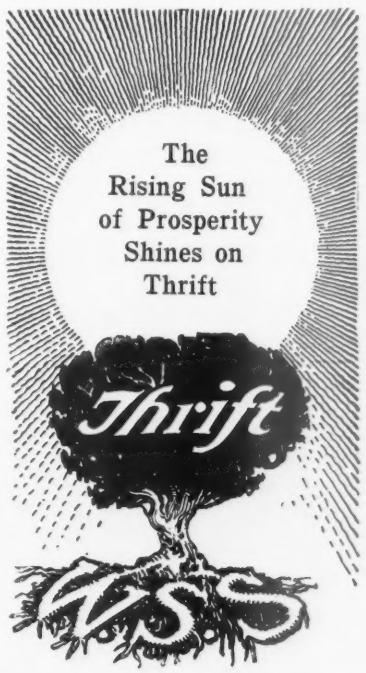
This season seven men lost their lives fighting the flames. Two died of spotted fever, one from over-exertion, and four were killed by falling trees. In 1910 more than 70 men were killed and many towns were wiped out. One crew of men this year was seriously imperiled and for many hours it was feared they had been cut off by the advancing flames. Another crew was forced to remain in a cold stream for 18 hours to avoid being burned to death, and similar measures were taken to save a pack train.

CARRIER PIGEONS REPLACE TELEPHONE

IN Oregon, as elsewhere, the telephone operators have been striking for better working conditions and as a result service has been more or less disturbed. William Sproat, of the Deschutes National Forest, however, did not worry much when he went to East Lake on special work, for instead of depending upon "central" at Bend to give him the proper connection, he took with him some carrier pigeons and in this way it was easy to send messages to his wife. The carriers made the distance from the forest to the cote in about 20 minutes and there was no "listening in" either.

PASSING OF LUMBER INDUSTRY IN PENNSYLVANIA

N. P. WHEELER, manager of Dusenberry and Wheeler Lumber Company, of Endeavor, Pennsylvania, says his company has between 6 and 7 years more to operate and its operations are closed in Pennsylvania. There are only four large operating concerns now in Pennsylvania: Good Year Lumber Company, Norwich, which, it is reported, has one year's cut left —about 50 million feet; Salmon Creek Lumber Company (E. S. Collins), Kellett



ville, has a life of perhaps 3 or 4 years; the Central Pennsylvania Lumber Company, Williamsport, operates five mills and will finish in all probability in 6 or 7 years. The cut of these four companies will approximate 225 million feet. (*Timberman*, November, 1918, page 55.)

DOUGLAS FIR INVADES SOUTHERN PINE TERRITORY

DIMENSION lumber is going right into Southern pine territory—a recent visitor in Portland, from Kansas City, a buyer for a wholesaler with line yards is authority for the statement that: "All of the retail yards west of the Mississippi River are handling nothing in Southern pine excepting finish and flat-grained flooring, everything in the shape of dimension is fir."—A shipment of oil rig stock or big timbers into Texas is regular but it seems strange to ship fir flooring into Dallas, but that is being done by a Washington mill whose headquarters are here, while Denver, that used to be a divided market between fir and Southern pine, is now absolutely fir. (*West Coast Lumberman*, May 15, 1919, page 25.)

NORTHERN PINE CUT IS LESS

"THE steady decrease in the cut of lumber in Minnesota will be more in evidence in 1920 than is generally supposed," says R. F. Pray, manager of the Red River Lumber Company, of Westwood, California. "The J. Neils Lumber Company, of Cass Lake, with a cut of 40 million feet, and the Nicols-Chisholm plant of the Shevlin interests at Frazee, with a similar cut, finish this year. In addition, the Weyerhaeuser plant at Little Falls, cutting 75 million feet, will saw its last board this season, and the two mills of the Northern Pine Company, at Minneapolis, with a combined cut of 100 million feet, will finish operations, to which must be added a 50 per cent reduction in the Cloquet group of mills, making a total reduction in 1920 production of approximately 450 million feet. Last year the Leach Lake Lumber Company, at Walker, Minnesota, closed. It had an annual capacity of about 20 million feet. The Deep River Lumber Company, at Deep River, Minnesota, closed in 1918, with a cut of 40 million, making a total reduction of at least 500 million feet in northern pine districts." (*The Timberman*, June, 1919.)

THE DECLINE OF A ONCE GREAT WHITE PINE CENTER

A RATHER gloomy picture of lumber conditions in the Tonawandas (Buffalo) is painted by a correspondent who says that but three lumber-handling gangs of twenty men each are working. A quarter century ago thirteen gangs of thirty men each were working almost constantly during the navigation season. Not enough lumber is coming in this summer to keep three gangs busy. He adds:

"The Tonawandas once held the record for being the largest lumber port in the world, but Chicago took that title from the local cities ten years ago and has since held it. The lumber industry here is being replaced rapidly by a variety of industries though it still holds an important place in the business world." (*Hardwood Record*, June 10, 1919.)

Think in interest—your own interest—save and invest. War-Savings Stamps pay 4 per cent interest, compounded quarterly.

LEAVES AND THEIR USES

Boston Herald

There is a great opportunity for some inventor to turn "the flying gold of the ruined woodlands" into real money by adding one more ingenuity to our new-found methods of economizing fuel. This is the season which we name from the fall of the leaves with little thought that foliage, moist on the tree or dry on the earth, has any sort of connection with daily living. Thickly as it may "strow the brooks of Vallombrosa," we treat it as an outdoor spectacle to be revelled in and nothing more and as we draw on the resources of our leaf bins, not to supersede coal, but to take comfort in a fair and cheap substitute for wood, it will be ours to wonder "why it was never thought of before."

GRASS

By John J. Ingalls

Late Senator of Kansas

"GRASS is the forgiveness of Nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated; forests decay, harvests perish, flowers vanish, but grass is immortal. Beleagured by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of Spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements, which are its ministers and servants, it softens the rude outline of the world. Its tenacious fibers hold the earth in its place, and prevent its soluble components from washing into the sea. It invades the solitude of deserts, climbs the inaccessible slopes and forbidding pinnacles of mountains, modifies climates and determines the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare or the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes its throne, from which it has been expelled but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet should its harvest fail for a single year famine would depopulate the world."

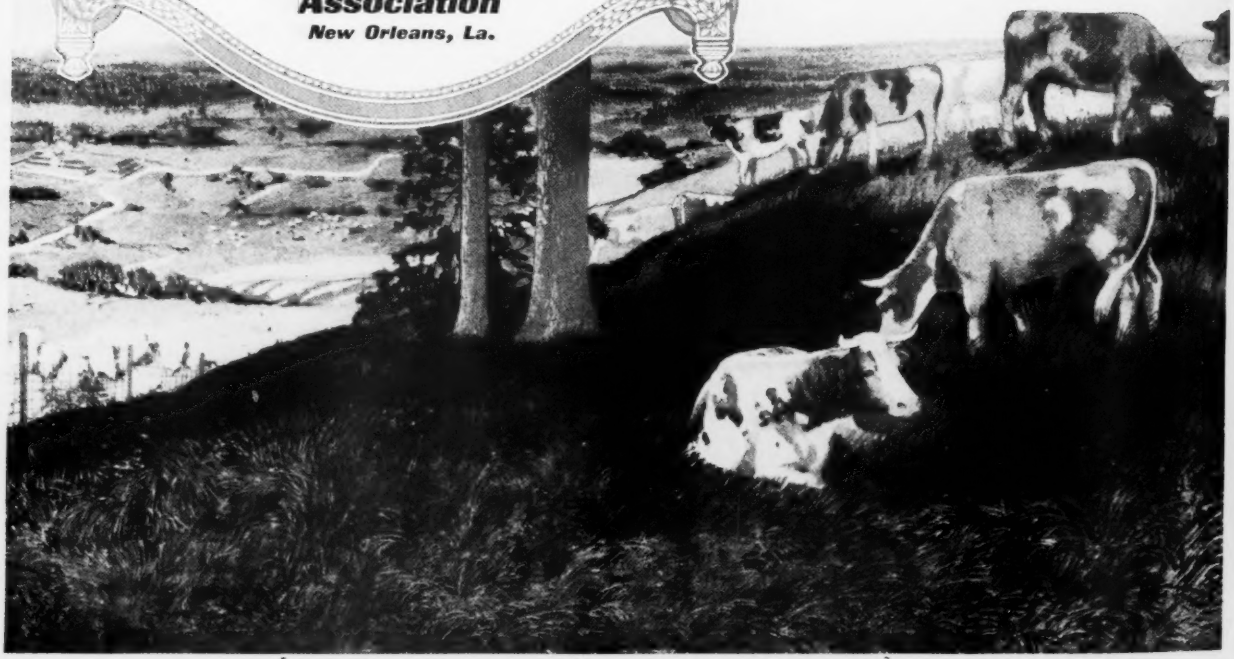
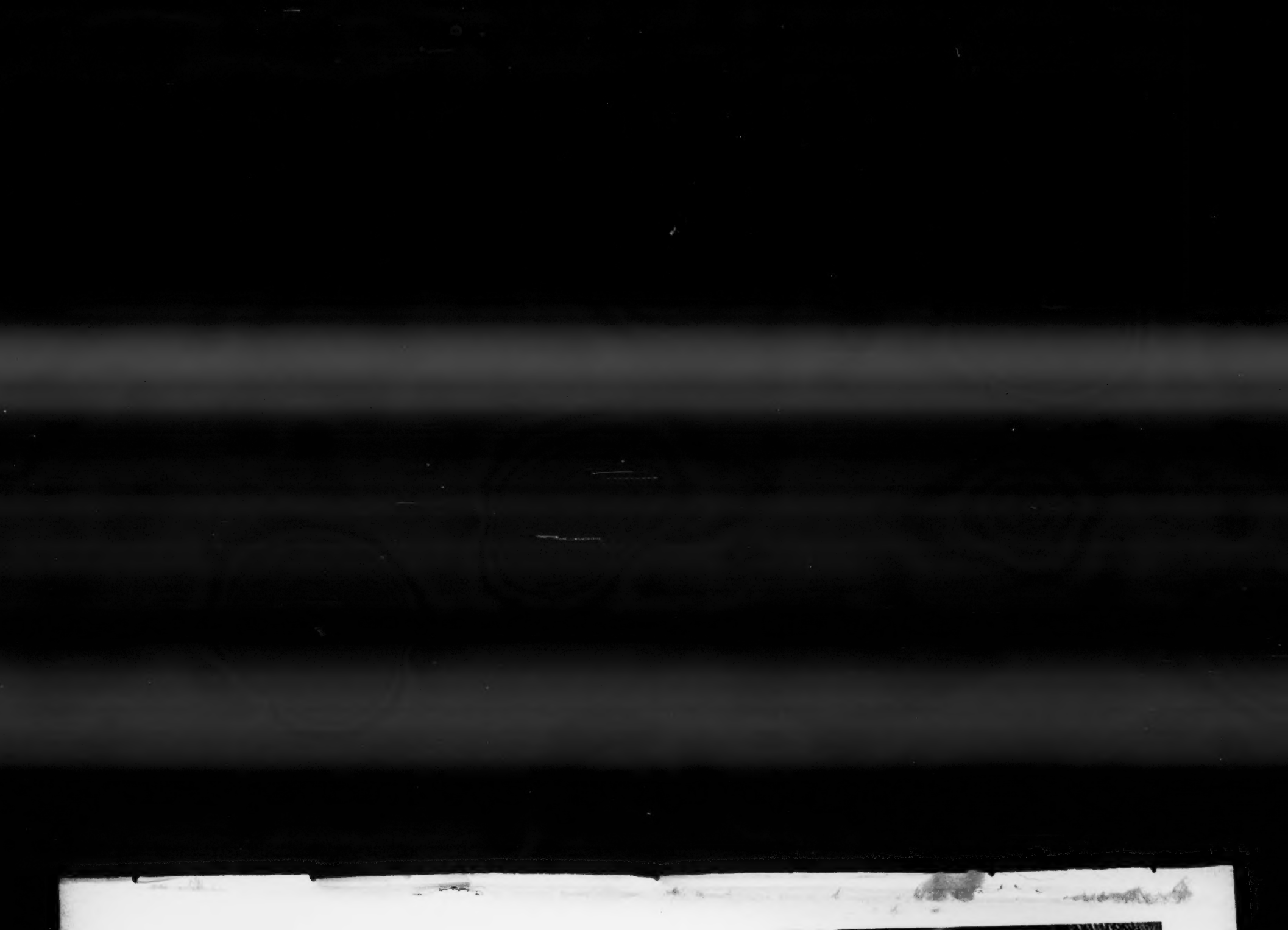
The South's future depends upon full utilization of its vast idle acreage, in agricultural pursuits, live stock raising and reforestation.

Cut Over Land Department

Southern Pine Association

New Orleans, La.

Southern Pine Association

NEW ORLEANS, LA.

SOUTHERN PINE SERVICE ASSOCIATION